USING PRE-MONARCHIC ISRAEL'S BET-AVE AS A SUSTAINABILITY PRECEDENT FOR A CONTEMPORARY DEVELOPMENT IN THE KILLBUCK/MUD CREEK SUBWATERSHED, DELAWARE COUNTY, INDIANA.

A CREATIVE PROJECT

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BY

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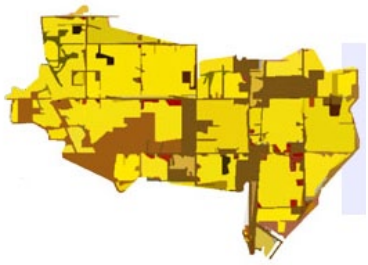

ABSTRACT

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CREATIVE PROJECT:

Using Pre-monarchic Israel's Bet-ave as a sustainability precedent for a contemporary development in the Killbuck/Mud Creek subwatershed, Delaware County, Indiana.

As we scramble to find modern solutions to our social and environmental problems, the culture of Pre-monarchic Israel has something to contribute to the conversation.

The Bible, and its critical literature, despite going into the details of the socio-economic order at its social, political, and economic levels, does not speak specifically about culture at the site design level. For example, despite elaborating on the policies that guaranteed land being distributed to every family, it does not go into detail regarding how much land, or how that land was managed, distributed, and designed.

The problem, then, is despite ample amounts of planning, policy, ideological and economic commentary in the texts, little is said about the spatial and systemic

dimensions of the community.

Besides further investigating the hermeneutic/anthropological tools for reconstructing ancient cultures, I will seek to fill this gap with other sources of information that reasonably answer the question of what factors (energy, water, food, material, environmental, etc.) must be considered and what are the relative weights of those factors in constructing a conceptual spatial footprint, to theoretically inform us of ancient Israelite culture at the material level.

Only when this problem is solved can the theoretical model be used as a case study for a contemporary development. The model will be used as a design framework for development in the Kill buck/Mud Creek subwatershed which will involve the master planning of a network of bet 'ave villages and specific site design of an individual Bet-ave compound.

The hypothesis is that any 100 member community could be sustainable by using bet 'ave principles. The assumption is that the socioeconomic order of Pre-monarchic Israel will provide valid guidance and a new direction in the design of contemporary village/nuclear family productive units.

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THE FRAMEWORK

INTRODUCTION

J.B. Jackson, in his short essay "The Westward moving House", describes in narrative form, three American houses and their accompanying socioeconomic systems. The first is an early American home, squarely in the middle of a New England village. Its design, on the one hand, integrated with the rural life; on the other, fully integrated with the social life of the village. The second (a pioneer's home) a self-sufficient small farm, speculative in nature, isolated in the large and vast Midwestern landscape. Its habitants with one hand on the farm, the other enjoying the wonders of nature. And the third home, a home where the "Midwestern farm" is leased out to some megacorporation, and whose owners work in a market-oriented job, producing nothing (save for what they collectively do at work), and consuming every item or service life has to offer (as everything under the sun has a market) and both hands are put to the service of these forces in both labor and leisure.

Jackson sketches these transitions (of the homes) as a sort of parable of how American culture has changed throughout time. From a series of villages/colonies on the east coast, to a vast network of self-sufficient small family farms spreading from the Appalachians to the west coast and most recently, to the market-based home and socioeconomics of the industrial revolution. (characterized as post-world war 2 America.)

Through his narrative, Jackson captures the essence of a major shift in Ameri-

can society - one in which ownership of the means of production (capital) was once decentralized into the hands of many (in the form of small farms, small villages), to one in which corporations own all the capital and people are rendered laborers (from grunt to intellectual) in the machine of the collective.

This shift from decentralized ownership to centralized ownership is bad.

The ethical advocacy for a critique of late industrial society rests ultimately on a social and human foundation. More to the point, people who do not own capital are not fully free in any sense of the word. There is a spectrum that can be called the patron-client spectrum (based on the reality of patron-client relationships). The "being" of client is the natural reality of not owning capital (i.e. "being" a patron). The clients, in turn, patronize the patron for everything because they own nothing. This spectrum, on one end, starts with chattel slavery, moves through indentured servants, into minimum wage laborers, into middle class laborers, into intellectual laborers, and into the specialized- highly paid-skilled laborers. This entire spectrum is a subset of the meta-term *client*.

Two types of people advocate the patron-client system; the patrons and the highly paid clients. There are sub-groups that resist this system, which typically advocate alternatives and sub-groups that acknowledge the injustices and advocate nothing. There is a also a group of people who, for one reason or another, suffer the consequences of such a system with more or less no awareness or consciousness of its happening, roots of its happening, or even a remote concept or belief in an alternative possibility. After all, it is a man-made and structural (unnatural, controllable, alterable)

system.

This type of concentration of the ownership of capital in the hands of the few is not new, and it has shown up more or less throughout history, to greater or lesser degrees, in some cases with more or less atrocious human/social stratifications and ramifications/effects. One point to note however: the current centralization coupled with mass production technology, creates unneeded products (stuff) that unnecessarily waste resources, use countless btu's to produce, emit dangerous pollutants into the environment, destroy habitat and contaminate waters, all in the process of transferring this wealth to the patrons at the expense of the clients.

Resistance to this type of socioeconomic order is also nothing new. (Ebenezer Howard's vision for the Town in the Country shares uncanny similarities to this project, also an economic philosophy distributism, built on a foundation of Catholic social teachings). In countless times have the exploited revolted against the ruling forces of its day and set up alternatives, most notably the American Revolution, where a client state demanded the liberty to self-govern and the right to the value of its own produce, promising access to the means of production to all able and willing individuals willing to work the land by the sweat of his/her own brow – the truest meaning of liberty, capitalism, and the pursuit of happiness.

A noteworthy inspiration of the American Revolution were the Judeo-Christian scriptures, which were the foundation, if not associative faith, of its people (and for those of dissenting disposition, it was in many cases, the source of their dissent). A story is told in these books of an earlier revolution (that led to the establishment of

an alternative social order which scholars refer to as Pre-monarchic Israel) where the centralized economic power and its resulting yoke of servitude to oligarchic rulers was thrown off and the *freed* society developed a new order based on the premise of equal access to land, which in that day, was the primary means of production…this was the true meaning of the promised land.

This creative project seeks to create one methodology to aid designers inspired by the American Revolution (more directly, Jeffersonian values) and Ancient cultures such as Pre-monarchic Israel, in the process of designing sustainable capitalistic societies in the spirit of egalitarianism. Especially, those designers who wonder how American socioeconomics could move East along J.B. Jackson's vector, and in particular towards the first home- the self-sufficient agrarian village.

The approach used in accomplishing this task is as follows.

A) The first step in this project is examining the Pre-monarchic era in Biblical literature and outlining a set of socioeconomic values that are embedded in their alternative community (which in some ways parallels J.B. Jackson's first house).... and then taking them forward as the basis of a design ethic for site development.

Some of these values are explicit in their policies and land-use systems, and some are more broadly rooted in their ideology. Either way, they lead to a decentralized economy resting on village-like family farms (and this was intentional and indirect response to state monopolies/land ownership of city states of Canaan).

B) The second task is to deliminate those values that can be designed with the

tools of the landscape architect. A module and framework for development will then be created.

Once the site design-oriented socioeconomic values have been outlined, they will be taken forward as the basis of a design ethic for a site development.

There are long-established traditions in both urban planning and landscape architecture that seek to design entire planned unit developments (Urban Revitalization, New-Towns -in-Towns, New-towns-in-the-Country, New-Urbanism, etc.). Some of these have been a great success, others were great failures. In any case, the profession should welcome new perspectives on old ideals, ideals that can be reworked into the modern landscapes, and ideals that can be repackaged to appeal to different cultural longings is varied places and times.

After all, it is said that a designer holds in one hand a vision for the way things are, and in the other, a vision for the way they should be. Undoubtably, reality is far more complex than theories and social models that are created on behalf of critique or advocacy. The reader may be critical of the definition of the problem, or the proposed solutions, but the measure of good design is the degree to which the designer solves the problem as it is understood, successfully. The effectiveness of a design may depend on the degree to which, and how accurately, the problem has been defined.

LITERATURE REVIEW

1

1 LITERATURE REVIEW

As outlined in the introduction, the first step in the development of a design framework is an analysis of Pre-monarchic Israel's socioeconomic order. While the analysis is not limited to site design, the goal is to determine what sort of values can be used as drivers of the site design process. This review of literature establishes the particular branch of Biblical studies that will be used as the lens through which the ancient culture will be understood. This branch of biblical studies (cultural materialism) examines how ancient peoples lived out their values in the everyday spheres of politics, economics, ideology and social order. The method of analysis is referred to as the cultural-material method.

Gottwald as Foundation of the Cultural-Material Method

Attempting to understand and reconstruct an ancient culture, such as Pre-monarchic Israel, in a contemporary context is no easy task. And despite taking a handful of religious studies at the college level, I am nowhere close to being a trained sociologist or cultural studies academic, therefore the weight of my inquiry has been deferred to the specialists in the field of biblical studies.

Yet, despite centuries of biblical studies and scholarship, a clear and concise analysis of ancient Israelite socioeconomic systems, the driving and informative dimensions of this creative project, surprisingly, is relatively a new undertaking. Perhaps the most significant contribution to this analysis is Norman K. Gottwald's 1979 "land-

mark book" The Tribes of Yahweh, that "launched an explosion of social scientific studies in the biblical field." (Gottwald)

The book, (confirmed in retrospect), set forth a new methodology for reconstructing the origins of Israel as the rationale for its socioeconomic existence. This method is called the cultural-material method. Championed by Marvin Harris as an anthropological tool "based on the simple premise that human social life is a response to the practical problems of earthly existence." The core principles that underlie this methodology are the basic distinction between behavior (etic)(e.g. how a society is structured in relationship to the environment, how it produces things, how it reproduces culture…its basic behavioral domestic and political economics, and the expressions of belief in the existential reality of art, ritual, games, science.) and thought (emic). Thus the material reality with their social and symbol systems, are held in juxtaposition to ideology and the more essesential realms of human through, rules, philosophy, beliefs, etc.

Whereas the emphasis in biblical studies has traditionally been on what the Hebrews (and their later manifestations) "believe" (and their "revolutionary" nature of their mono-theistic faith), emic , Gottwald has oriented his followers to the realms of what the Hebrews "do", etic, and attempts to draw connections and allow their actions to drive the discussion about who they were as a people. What Gottwald and his fellow cultural materialists conclude, is that ancient Israel is "revolutionary" in the sense that their politics, economics, social systems, and ideological systems were exactly opposite (a revolution, a turning away) from the cultures and nations of ancient Canaan that

sought to dominate them, and that this insistence on their own original "order" was rooted in deep convictions about the dignity of the human person.

This book has inspired numerous authors, academics who have since restated the conclusions in various other forms and depictions (some more simply than others). Yet without a doubt, despite this influence, no one has come close to topping this 900-page book's comprehensive exploration of the biblical literature through the lens of cultural materialism.

"Norman K. Gottwald, Professor of Old Testament Emeritus at New York Theological Seminary is the author of numerous works, including The Tribes of Yahweh, All the Kingdoms of the Earth, a Light to the Nations, and The Politics of Ancient Israel."

It is The Tribes of Yahweh that will play the strongest source of understanding, in the cultural studies dimension of my thesis, as this book serves, in a sense, as a source for most development in the cultural-material school.

As for the book itself, being such a new and controversial thesis, Gottwald goes to great lengths, delimitating his own method, in context of the history of biblical methods, then literally going through the biblical narratives and constructing his arguments line by line. Each of these arguments illuminate specific dimensions of Israelite culture (political, social, economic, and ideological) Each of these arguments point to a meta-thesis that there is a functional relationship between Israelite cult (religion) and their socio-temporal expression. **As to the purposes of this thesis, these sorts of discussions are irrelevant, only the portion of the book that uncovers the problem/question what did the socioeconomic system look like is relevant. This**

comprehensive discussion on the social structures of Israelite society and its comparison to other similar and not so similar ancient civilizations in the region is the portion of the book that will guide the design process.

Again, because his meta thesis is primarily concerned with crafting an argument for the proposal of cultural-material method as a legitimate and informative biblical studies methodology, and relationship between form/action and order/belief of Israelite faith (is no doubt important and relevant to the field of biblical literature which the thesis forever transformed) this, too, is beyond the scope of this creative project. What is left then is this middle discussion on the descriptive nature of the Israelite social order itself and biblical literature's textual evidence for insight into the societies material expression. **The book, offers the field of biblical literature the foundation of cultural-material method in dense, "academic jargon" that is accessible in the sense necessary for the defense of such a treatise. But perhaps too academic and comprehensive for the limits of what is in the power of a Landscape Architect.**

Many other scholars in the field have elaborated and expressed key ideas in the context of this type of biblical study. These articles addressed below, although inspired by Gottwald do not have the same burden of being the seminal work on the subject and are unconcerned with the premise (as Gottwald has secured that legitimacy for them) of defending the anthropological method. These articles tend to be more to the point.

It is addressing the material expression individually and in the article form that

I feel is the most fruitful. The following articles for review, then, touch on the field of thinking that Gottwald thinks in, which approaches dimensions of the society, political, economic, social, and ideological (symbols) in ways that are conclusive into themselves and not pointing to the meta-thesis.

But before we explore the other articles for review let us first note an exceptional "essay review" written by Walter Brueggeman, who manages to present the key concepts of Gottwald's tribes of Yahweh, and criticizes the articles in its own ways (these criticisms are in the realms of Biblical studies theory and the fear that people would take Gottwald's thesis too far, stripping Israel of the importance of its faith entirely) while admitting that what Gottwald had written is one of the most significant works in the history of biblical literature. "Walter Brueggeman is an American Old Testament scholar and author. Amongst his many degrees, he was professor of Old Testament (1961-1986) and Dean (1968-1982) at Eden Theological Seminary. Beginning in 1986, he served as William Marcellus McPheeters professor of Old Testament at Columbia Theological Seminary, from which he retired in the early 2000s He has authored more than 58 books, hundreds of articles, and several commentaries on books of the Bible. In Bruggeman's review, he echoes Gottwald's notion that the "religion of Yahweh, cannot be understood outside the sociopolitical community which articulated, transmitted, and practiced the religion" While the review again talks mostly about the methodology of biblical criticism, and study which has been identified as beyond the scope of this thesis, he also points out the distinction of the nation's political organization and structure and affirms Gottwald's analysis.

Family as the basic productive unit of society

Servants of Gods and Servants of Kings in Israel and the Ancient Near East

Dexter E Callender Jr. has taught at the University of Miami since 1995. A recipient of the 2000 Provost's Excellence in Teaching Award, he was also named "Professor of the Year" by the Pan-Hellenic Association in 2001. Callender's article very effectively and succinctly takes us into the social and political status of the Hebrews during their time in Egyptian bondage. This article does a comparative analysis of the various types of slave systems in the ancient world and seeks to draw distinction, and effectively so, to the experience of the Hebrews in Egypt where they were essentially wage laborers. Like too much of Gottwald's work, these sort of analysis of social injustice in the ancient world set the stage for understanding the rationale for the Israelite system. **This directly relates to the creative project in the acceptance of the scaling and sizing of a manageable household and clear textual understanding that the basic productive unit of society, normatively, was the family farm employing no other workers. The family unit then was built on an ethic of non-wage labor and non-slavery through the insistence on capital being spread into the hands of all people. This informs my design decisions as I know that the Bet-ave must not be larger that what is manageable by people without servants.** This sort of discussion sets the stage for a more in-depth exploration of the basic productive unit, and the type of production system that accompanied it, the household form of production by Roland Boer.

Women First? On the Legacy of 'Primitive Communism'

Roland Boer previously taught at the University of Sydney, McGill University, the University of New England, the United Theological College, Sydney and the University of Western Sydney, is the author of the following books: Marxist Criticism of the Bible (2003), Last Stop Before Antarctica: The Bible and Postcolonialism in Australia (2001),Knockin' on Heaven's Door: The Bible and Popular Culture (1999), Novel Histories: The Fiction of Biblical Criticism (1997) and Jameson and Jeroboam (1996). He is founding and managing editor of the international journal, The Bible and Critical Theory and a member of the Editorial Board of Semeia Studies."

http://www.jesus-project.com/fellows/r_boer.htm.

In his article, Women First? On the Legacy of 'Primitive Communism' – he in a sense, builds upon the work on Gottwald, primary the notion of the household means of production being the basis of the society, and goes into an in-depth look at this basic unit of society and especially explores the division of labor that took place in this social structure and the relationship between men and women. Concurrently he links other academics to this type of analysis and proposes that despite using different terms, e.g. communitarian (Gottwald) household (Carol Myers) domestic (David Jobling and Ronald Simkins) and familial (Gail Yee) that each of these terms are getting at the same basic idea that the basic of all Israelite society was the household means of production. This article is excessively long winded in its description of these similarities and gets off task in the exploration of the concept of the gens as another form of analysis that could be applied to the studying of ancient Israel (a concept somewhat

criticized by other writers) but nonetheless manages to bring these authors to the same table and link the literature in such a way that was necessary. There seems to be too many theses in this article that it may have served the author better to break it up in a series of different articles. But nonetheless reaffirms and emphasizes the role of the family as the productive unit in Israelite society.

The Family in the Bible

James Sanders, in his article The Family in the Bible says the same thing but looks at the ever changing role of the family through the entire bible. "James A. Sanders is an American scholar the Old Testament/Hebrew Bible and one of the Dead Sea Scrolls editors. He was the first to translate and edit the Psalm Scroll, which contained a previously unknown psalm. Sanders retired in the late 1990s, but still publishes and lectures regularly. Sanders taught at Union Theological Seminary in New York, NY and at the Claremont School of Theology, Claremont, CA. While at CST, he founded the Ancient Biblical Manuscript Center for Research and Preservation (ABMC), a microfilm archive and research center for ancient and medieval manuscripts related to the Bible." the thesis effectively goes beyond other writings in its ability to sketch the role of the family and how it changed over time in response to the various iterations of Israelite society. **It is informative and relative to the thesis as it outlines the role in the family during the pre-monarchic era where it was the most integrated and crucial to the success of the social order. It also goes on to explain how the family is not simply a productive machine but a means of sharing in the daily gift of life and the mutual support and society needed for a fulfilling humanity.**

Landscape elements on Bet-ave site that reference larger allegiances.

The Origin of Yahweh-Worship in Israel

Lewis Bayles Paton's article is basically a treatise in the origin and of the use of Yahweh as a sacred name, and seeks to explore the use of that name coincided with the revelation of the socioeconomic order to Moses. While this general discussion on the cult and religion of the society in some sense is beyond the scope of this project, what is not beyond is the emphasis that the cult was decentralized during the time of the pre-monarchic period and that each family had shrines to Yahweh which they used as they waited for the national shrine to make its rounds. Again, while this article is beyond the scope of my research, it does begin to ask the question as to the site placement of a shrine on the Bet-ave development that would have undoubtedly been used by the community in some sense.

Israel in the Pre-Monarchy Period

Israel in the Pre-Monarchy Period by D.H. Mayes of the Department of Biblical Studies, Trinity College, Dublin , Ireland presented one of the first arguments for the comparative analysis of pre-monarchic societies: that the Israelite society can be understood in the from an amphictyony (Grecian early democratic society) where the tribes were centered on a central temple which had political power over the people, like a religious body of rulers. This theory was argued against in Gottwald's **Tribes of Yahweh**, in which he painstakingly proves in scripture the fallacy in this theory. Nevertheless, in making this argument, Mayes brings to the attention key meta-landscape

features in the biblical literature that do seem to demonstrate the presence of meta-sacred sites, and organizational forms that serve and unifying elements of the entire 12 tribe confederacy (despite its overwhelming decentralization). Since my project is limited to the study of the Bet-ave, as the basic socioeconomic unit, these sorts of tribal confederate landscapes are valid context for my development. Mayes also discusses the judges who served as assistants in helping Bet-ave leaders to interpret the laws of the land.

The Men Who Made Israel

George S. Goodspeed, in his article The Men Who Made Israel, further analyses these key informal leaders who managed to emerge at the perfect times to stitch the large tribal confederation together to respond to a timely need. But the literature seems to suggest in any case that these leaders emerged to fill temporary roles and untimely they had their roots in their own Bet-ave.

Traces of Primitive Democracy in Ancient Israel and Terminology of Israel's Tribal Organization

In Traces of Primitive Democracy in Ancient Israel and Terminology of Israel's Tribal Organization by C. Umhau Wolf (a Lutheran minister and biblical scholar who was pastor of St. Paul's and Hope Lutheran churches) addresses two key issues to the planning for the basic unit of Israelite society, the Bet-ave: one, the that the Bet-ave was the lowest common denominator for the society ranging anywhere from two to four generations in this one household, two, because it was decentralized, it also meant the Bet-ave was a center of political order. How was this political order as-

sembled? Two key concepts come forth in the article relating to the democratic process of the Bet-ave and the larger structural form. One, is the "place" of assembly; Wolf mentions the presence in the bible of the assembly taking place, in a tent, close to the community shrine, or at the gates of the settlement. This also presents the key need for the place these sorts of structures in the community that have a certain degree of prominence for the people who live there have the real responsibility maintaining the order.

Socioeconomic policies that insist on the basic unit of society being the household economy.

Holy Year 2000: Biblical Origins of Jubilee

John Samaha "belongs to the Pacific Province of the Marianists, and is currently working at Villa St Joseph in Cupertino, Calif. Previously he was engaged in high school and adult education in the western states and Lebanon. He is a member and officer of the Mariological Society of America." In his article Holy Year 2000: Biblical Origins of Jubilee, he more clearly than any other explains the interrelationship between the economic laws that serve to strengthen and maintain the family unit. He is also quick to point out that the section of the biblical literature that carries the weight of describing the socioeconomic order only appear twice in the Catholic Churches two year weekly cycle lectionary. **While masterfully explaining the meaning of jubilee and means of achieving a viable socioeconomic order rooted in the family. Brother Samaha once again manages to point to the decentralized family farmstead as the ideal means to ensuring liberty and justice for all. At the core of these policies and**

foundation of the Bet-ave is the reverence for land.

Wasteland to Promised Land: Liberation Theology for a Post Marxist World

by Robert V. Andelson and James M. Dawsey

"Andelson received his Ph.D. from the University of Southern California and was an ordained minister in the Congregational Christian Church. He was a member and past V.P. of the Board of Directors of the Robert Schalkenbach Foundation, was a Distinguished Research Fellow and member of the Editorial Board of the American Institute for Economic Research, and was past president and a member of the Exec. Com. of the International Union for Land Value Taxation." The role that land played is the key point of this article and has laid the foundation of the Israelite society and the foundational relationship that the Bet-ave has to the land.

Similar to Samaha, they explain how distributing land and ensuring its distribution is the key to the basis of the Israelite society order. They explain how the land is the basis of all economic decisions making and gives many case studies of biblical instances where land issues are raised and how leaders dealt with them. He also makes connections to our own age and how some of our very land use policies are rooted in some of the same cultural ideologies the Hebrews themselves resisted. **These articles relate to the problem in two ways: one, they confirm once again the role of land and the decentralization of the economy in to productive household units is the means of liberation for slave and working classes; and two, that framing of the bible and linking of the bible in current realities begin to set up the advocacy portion of my thesis.**

The Bible, the state, and the Economy: A Framework for Analysis

John D. Mason and Kurt Schaefer

This article, along with some of the other articles written by this duo brings the principles of the Israelite socioeconomic order into the modern discussion by showing the linkages between modern economic histories. I.e. Adam Smith and mercantilism, and uses this history as a means of exploring the pre-monarchic principles in a living reality and not in the text itself. The authors also give case studies as to how these sorts of principles (interest issues, debt issues, etc) could be implemented in third world countries. Schafer who hold a PH.D in economics from the university of Michigan is exceptionally positioned for this sort of direct application of some of pre-monarchic Israel's more fiscal and 'federal" economic policies. "He received (with John Mason) the 1991 Christian Scholars Award given by the Christian Scholars Review. He is editor of the Association of Christian Economists Working Papers Series and moderator of the Association's electronic discussion group."

Conclusions for literature on pre-monarchic Israel.

While not all the literature reviewed here talks explicitly about the systems and material of the household productive unit, through discussing every aspect of the society, from the actual production, to the social, to the political and meta-economic and ideological policies, everything points to the Bet-ave as the basis and foundation of the economic order. However, basically none speak to the actual size and scale of these Bet-aves because the archeological evidence is simply not there. The closest I have come to finding anything on the topic is a breakthrough that widespread linked

compounds of three of more four-roomed houses have shown up in archeological work across the highlands (of contemporary Israel) is this Bet-ave (Boer ,18). Yet this says little about constructing such a project and how it would best be arranged.

In Gottwald's own admittance we can only theorize about the degree that the Bet-ave has multiple living units dependant on size, and how each was managed. From stories in the bible we can show that there were a clusters of dwelling units for larger Bet-aves and we also know from the archeological evidence that Israelite homes were modest in size though these "villages" have sizeable temples. But these are extremely qualitative terms, and for exact numbers and sizing of these Bet-ave's we have to rely on other reasonable sources. And this is the gap in the literature.

If the society was truly oriented towards this self-sustaining unit, but there are no explicit dimensions or quantifiable evidence, we must assume that the approach and the art of independent survival (in the bubble of mutual benefit) with limited means is the same today as it was 3000 years ago. For survival took place under the same set of laws of physical reality that operate today. While they may have had the advantage in the availability of land and, in some cases, resources, we may have the advantage of technologies to exist despite a lack of resources. In order to comprehend the forms that these societies may have taken, we must employ a methodology to explore homesteading literature, and then develop a series of baselines as a framework for development.

REPORT SUMMARY

2

2 SUMMARY OF REPORT

The following "report on the literature" aims to clarify the socioeconomic goals and objectives of the Pre-monarchic Hebrew society. By digging deeper into the literature and identifying the various political, social, ideological, and economic values we begin the process determining how they can expressed in contemporary contexts and represented in site development. This *summary* outlines some of the larger narrative issues of the entire report and outlines key values to consider when examining the report in its entirety.

In order to understand the socioeconomic order of ancient Israel, we need to understand the context. Moses was the leader of a group of people commonly known as the Hebrews (prior to the pre-monarchic era circa 1200-1000 BCE). The Hebrews were descendants of a man named Abraham and they historically lived a nomadic lifestyle (as herdsmen) for generations. (Circa 4000 BCE)

The skill set of the nomad rests on the ability to be mobile in response to changing climatic, social and political conditions revolving around the nutrient flow of water and carbon life-forms (i.e. food and water for their flock). A generic example would be the necessity of moving the flock in response to water availability and tribal conflict. Thus, one of the key requirements of the herdsman is a wide range of land which the he can navigate in search of water and safety.

A significant contextual happening in the time of Moses was the rise of nation states. These were socioeconomic entities (like today's nation-states) that had

abandoned the herdsman way of life (& hunter gather lifestyles) for sedentary, agrarian lifestyles which, incidentally, also demanded vast amounts of land for agricultural purposes. With the discovery of agriculture, nation-states were capable of storing up food and using it to sustain large populations of people. These populations grew, and in turn, required more land-area. The nation-state storehouses of food also made possible the specialization of labor and formation of standing armies to defend food and food sources.

Prior to the Pre-monarchic era, there was widespread, severe drought. In response to this drought, herdsmen were forced to be *constantly* on the move, yet the land range options were drastically diminished due to the expanding footprints of nation-states and so the herdsmen had no place to go to take their flock. This conflict benefited nation states which defended their lands with a standing army (enabled by agricultural surpluses). Under these circumstances; the herdsman lifestyle began to diminish to the point of extinction. This was true for the Hebrews who, during a period of significant drought (7 years), had no other option but integrate with the Egyptian nation-state and work for the "landowners".

A key characteristic of most nation-states at the time was the ownership of land (and power) in a hereditary monarchial family. This was the case with the Egyptian nation-state where the royal family owned 80% of the land (Callender, 7) and bordered Hebrews territory. It became their overlords at the result of drought.

The ownership of land in the hands of the elite required the Hebrews to be serf-laborers, having no economic power of their own and no potential for acquiring

such. They were forced to work for the ruling family with no other economic options in the bleakest conditions. It was these conditions i.e. serf labor, ideological and physical oppression, and zero-ownership of land [capital], which became the socioeconomic context from which the story of Israel's alternative socioeconomic system, advocated by Moses, unfolded.

Search for another way:

Due to their intolerable labor and class conditions, the Hebrews left Egypt in search of land to set up an alternative social order under the guidance of Moses (which according to Hebrew theology, he received on Mt. Sinai). The new Hebrew socioeconomic order was in direct contrast to the hereditary monarchy of Egypt. Land, seen as key to economic power and independence, was the central element of the Israelite economic system. Unlike Egypt, land was equally divided among all the Israelite families and was a guaranteed right to these families indefinitely. Land (capital) was not a commodity and was neither bought nor sold. Policy measures were in place to prevent families from acquiring more land than what was required for their own sustenance. This guaranteed that economic power was distributed evenly throughout the entire federation and that no one family could rise to dominate the others (thus eliminating serf labor).

Political Power

The political power was distributed to each household as well. The head of the house was the sole legal authority. Each household leader met in council with the heads of every other household to clarify and debate the law and its enforcement, but

this collective counsel had no legal authority. From within the council, leaders would emerge as supreme interpreters of the law (judges) but these interpreters were seen as legal counselors and not rulers in their own right.

"Religion/cult" foundation for unity

Due to the decentralization of both economic and political power, a third functional pattern, what we typically call "religion" was the binding social glue that held the federation together. Yet this term "religion" is not typical of its usage today i.e. as something independent of political and economic policies. In the Israelite culture, religion was something integral that had a direct functional as well as "political" relationship to the socioeconomic order, to the degree that both entities mutually reinforced each other.

It must also be noted that the cult was in itself decentralized and though there was a priestly order that perform the rituals that reinforced and maintained the allegiances to the federation and its socioeconomic policies, members of the priest class were not direct rulers, nor did they require tithes or taxes to sustain their own existence since had their own land which they maintained for these purposes, and what tithes *were* collected were to be distributed to the poor.

This is the basic description of the Israelite socioeconomic order under the guidance of Moses.

Economic values to inform contemporary development

The task at hand is to design a community based development based upon

these historical principles and patterns. The dominant pattern being ecologically bases land parceling and distribution.

As mentioned, land was distributed to each family (a distribution which was maintained by numerous integrated economic and political policies) in the Israelite federation. Further analysis reveals that family does not denote nuclear family but an extended family known in the Israelite federation as the Bet-ave. The Bet-ave was a 80-100 (average) person self-sustaining unit, often clustered with other Bet-ave's for protective purposes but economically independent and self-maintaining.

In this contemporary design proposal the Bet-ave will serve as the base module for a planned unit development. Although the size and ecological footprint of each Bet-ave is directly related to the contemporary environmental context and availability of technology, it must be noted that the spatial boundaries must be configured so that the Bet-ave can perform self-sufficiency functions indefinitely into the future, insuring its practical sustainability.

Contemporary issues

Because the Bet-ave is in its core, sustainable, it becomes a key point of discussion in the current exploration of built-environmental systems and solutions that respond to contemporary crises and ecological problems. It can serve as a model for better contemporary planned unit development and urban/regional planning.

The site chosen for this particular thesis project, using the normative values of the Israelite socioeconomic order, is in Delaware County in East Central Indiana. The

site boundaries of the Bet-ave, as mentioned above, are responsive to resource availability and the energy/consumption demands of typical Midwestern family. Research in to self-sufficiency design comes from existing self-sufficiency laboratories in comparable site conditions (40* lat)

Other key points were as follows:

The Productive Process

Family unit valued; primary productive unit.
Production was weighted heavily towards household.
Production and consumption were on par
anti surplus, work stopped when needs met.
Wage labor [slavery] was normatively prohibited
Monopolies were normatively prohibited.
Food could not be sold at a profit.
Interest was prohibited on loans

Foreign Affairs

The new socioeconomic order was revolutionary, it had to struggle to maintain its independence and isolation from other nation states.
Defended itself through a militia, not a standing army.
Society was neither expansionist nor evangelical.

Furthermore:

Cult was the bonding element(of the decentralized society). It was aware of its need for cultural sustainability and in this sense was protective and demanding, but in turn offered/afforded socioeconomic liberty.

BET-AVE

3

3 REPORT ON THE LITERATURE

As a first step in our report, let us explore the concept of the Bet-ave. This term embodies a series of meanings. It is a foundational element for the broader task of discerning the entire socioeconomic system.

What is the Bet-ave?

1. Family

In its most base definition, the Bet-ave means family, or literally, "father's household". It is probably better understood as an "extended family" household rather than our contemporary nuclear family arrangement. It included the oldest remaining parents and all their married sons and their children (and perhaps even grandsons and their wives and children. (Sanders, 1) Because wives left their family to become a part of the husband's Bet-ave (extended family), it also included unmarried daughters at all generational levels. This extended family unit could number as many as a hundred persons at any time." (Sanders, 5)

Social norms and laws were in place to ensure that the family was valued. To honor one's parents often involved deep respect of the family lineage and allegiance to the family priorities above ones own. (Exod 21:15-17, Lev 20:9) (Sanders, 2) In sum, Hebrew society was family oriented and the Bet-ave was the basic social unit of the society. (Sanders, 5) We often refer to "family-values" in contemporary rhetoric but in Hebrew culture the family was much more than a value, it was a way of life. As we will

discover, the Bet-ave was not just the social center, but the center of economics, government, and religion.

Recent archeological excavations have confirmed that the extended family numbered as high as 100 persons through multiple discoveries of linked compounds of " three of more four roomed houses" in the middle eastern highlands (Boer ,18) The complexes/compounds involved land and clustered homes (sometimes jointed) which give evidence that the individual families were collective and formed a distinct social unit. (Sanders, 5) (Boer ,26) Furthermore, multiple Bet-ave's were grouped together in looser configurations (for protective purposes) while preserving their own independence. This informal cluster of Bet-ave's were called Mishpochah, or clans. These clans were again grouped into another clustering called tribes and the literature describes Hebrew society as consisting of twelve such tribes (At least symbolically). (Sanders, 5) It is important to note that there was a distinct perception of a"family" connection between each Bet-ave as the members of the entire tribal federation considered themselves brothers and sisters of the same God.

2. Productive Unit

Another key characteristic of the Bet-ave, besides being organized by bloodlines, was that it was self-sufficient. Self-sufficiency, for the Hebrews, was built on the foundations of agrarian and animal production. ("Rain agriculture (grain, oil, wine) with a sizeable pastoral economy (bovine heard, cattle-sheep, and goats) (source) The families worked together to provide the individual needs of the community. The land footprint required for the Bet-ave's self-sufficiency was held in common by the mem-

bers of the kinship unit (Boer, 6)

The Bet-ave was balanced in terms of producing goods and services in relationship to what they needed (Mott, 1) Therefore, there was no need to produce surplus as all produced goods were consumed on site by its immediate users (Boer ,6) This also means that there was not a presence of a nation-wide market mechanism to distribute food and other resources.

As we discovered in the literature review, scholarship in the field of biblical studies has only recently recognized the presence of such a system in the biblical literature and has referred to it in various terms: communitarian, household means of production, domestic means of production, or the familial mode of production (Boer ,1) Marshall Sahlins (an anthropologist) was the first to propose this form of production and his theories were the result of archeological discoveries that characterized the ancient cultural landscape as one denominated by domestic buildings with virtually no fortifications (Boer ,9)

From a capitalistic vantage point that glorifies surplus, it may be obvious to call the domestic mode of production as a one of 'underproduction' . (Boer ,15) But it is important to distinguish between authentic affluence and simply having more than one needs. "It all hinges on what constitutes the "crucial intangibles" of satisfaction and livelihood. " (Boer ,15) Consider such thoughts:

Since the domestic mode of production is an anti-surplus system, that is, livelihood is the primary objective and nothing more, then only those tools necessary for such a system will be needed, thus if there is social or political pressure for increased production, getting people to work more or more people to work,

particularly for activities outside the prime economic unit of the household, then it will be meet with resistance and be refracted though the households in which surplus is unnecessary (Boer ,*15)*

Such "crucial intangibles" are worth exploring. Is there value in producing only what is required for survival - and using the balance of time in pursuit of other activities? The question is ultimately one of personal values and, as we will discover, the Hebrews valued familial self-reliance and ownership of the means of production above notions of abstract wealth or simply financial gain. (Boer ,17) In ancient Hebrew culture, economics was not the "end all, be all" of daily life and was, in some ways, a part time activity or an activity undertook by only a portion of the family. When such intangibles are met, "self-sufficiency" for example, all additional economic work may come to a halt. (Boer ,17)

The result of each individual extended family unit having ownership of the means of production is a federation of self-sufficient family farms. These family farms would also be the means of economic freedom and "the best way to prosperity in the ancient world". (Issues,1)

3. Constitutional (covenant) Government

A third key characteristic of the Bet-ave and Hebrew society as a whole was their decentralized government. There was no over arching government (such as a state or federal) but this is not to say that there was no government or that the culture was anti-government. There was indeed a judicial system but this system was executed in each individual household chartered by the federation wide religious covenant. Because their ideology and covenant was rooted in theology, one might even be

inclined to say that the form of government was a theocracy. Yet even this is misleading. Despite the presence of obvious cultic observances and even a priesthood that guided the observances, the priesthood was not direct rulers in any sense. (Wolf, 1)

Each Bet-ave was responsible to the ethics, laws and policies of their ideological covenant and were the primary enforcers of such principals. Each "elder" or household leader was responsible for educating his or her family, interpreting these principles (now commonly called the Levitical code or "Torah" in its written form), and enforcing them in the day to day life of the Bet-ave community. Controversial issues were deferred to judges, who were esteemed as superior interpreters of the law and public policy. And to note, some of these supreme interpreters were women. (Boer, Wolf)

Although speculation will always be speculation, we might imagine that in a society where there is no elected body of people (an official religious body or purely secular one) whose full time job is to govern the masses – the responsibility of government rests primarily in each family and is truly constitutional. This is perhaps a truer sense of self-rule or self-government then even the most democratic of modern societies exemplify. With no over arching government bureaucracy, a picture begins to emerge that there was strong moral conviction for their way of life and that this conviction held the community together (agreed upon in their constitution or covenant). Therefore, the Bet-ave not only is a familial organization and a productive unit, but a source of governmental authority.

Presumably, for such a decentralized, covenantal system to function, a tremendous awareness, conviction, and will, on such a large community wide scale is neces-

sary. This makes us wonder, how did the Bet-ave succeed as a governmental entity? Where does this " fierce loyalty" and passion to the ideals of this system, that undoubtedly was required for their success, come from and how is it continually feed and maintained?

Gottwald's theory is that religious accountability fed the institutional accountability and that these two forces were one and the same thing. Since Hebrew law, government, and religion were so linked, looking at them independently is problematic yet can be helpful inasmuch as we are accustomed to thinking about society in these schemas. Yet, we should not let those schemas misguide us, as this integration is crucial to the success of understanding the society. That is to say, in contemporary American culture we are accustomed to thinking of a separation between religion and state whereas in Hebrew culture, there were intrinsically linked i.e. Hebrew religion was the covenant government.

The tremendous role of the Bet-ave

A society that requires so much individual autonomy in its operations (the Bet-ave being the autonomous source of production, government, religion) must require a great deal of autonomous moral conviction and authentic faith (of its users) in the covenant and ideological order, otherwise it may fall into complete chaos. And because there was no "other" aforementioned body of electorates to handle nation building, internal affairs, or foreign relations, there was indeed no one whom responsibility could be deferred. (No room for apathy). What a tremendous role the Bet-ave played in this system, as family, as producers, as government, as source of defense, education,

energy, human services, justice, etc. One can only imagine the tremendous literacy required, at least at the level of each Bet-ave elders, in order for such a system to be successful. The demand for a literate household with authentic desire and allegiance to their covenant and way of life must come from somewhere real within each participant, that is, true conviction. From whence did this conviction come ?

I hope to begin to answer that question in the next section "Rationale for understanding the systemic conviction" .

RATIONALE

4

4 Rationale and Understanding the Systemic Conviction

"The two facts of life are land and labor or space and land, and there are two facts with which the bible deals. To avoid the issue is to render theology irrelevant the interpretation of scripture dangerously lopsided. War is the most consuming preoccupation of the word, and armaments are the largest industry in the world. And what is ware about? Who controls space! No effort to bring about peace can have any lasting effect without confronting this issue. The choice that faces the human race is justice in the allotment of space --- or bloodshed. (Claiming, 4)"

One of the key points in understanding the early Hebrew society, the Bet-ave, and its political-religious-ideology, is to understand its history. The people were, at one point, nomadic herdsman, but as the result of drought and subsequently the emergence of territorial national states, that were claiming land, they could no longer migrate to other areas in response to that drought– marking the end of the herder migration era of the Hebrews in the near east. They could either find employment in Egypt, where they would work for the pharaoh, or die. Although initially they had favor with the ruling Egyptian elites, after some time, the new pharaoh did not look so kindly on the Hebrews and subjected them to intolerable working conditions. It is my assumption that during this time the Hebrew people questioned severely such injustices (I have heard my peoples cry) and even questioned the notion of such a system designed in such a totalitarian fashion i.e. one that would even permit such injustices to be possible. After some "intense negotiations" with the Pharaoh via Moses, the Hebrews were free to leave Egypt and faced with their own task of building a new society.

EXPERIENCE AS SLAVES

Understanding the pre-monarchic land use ethic is the first step in understanding the system that made the subsistent agrarian economy possible. In order to understand the rationale for the land use ethic, one must realize the problematic experience that the Hebrews must had underwent as slaves in a foreign system, to underestimate this impact is to miss the point. One of the most significant figures in Egyptian civilization is the fact that 80% of the land was owned by the ruling class. (Callender, 7) That naturally led to the fact that most citizens had no other option but to be workers or laborers.

The word used to describe the Hebrew experience in Egypt is slave. But first, we must clarify and check our assumptions as to what is meant by the term slave, the most common denotation of the Israelite experience. Also, a closer examination of the concept of slavery in the ancient near east puts the reality of the Hebrew experience in context of our own modern experience. The fact is, slavery in the Ancient near East is not Chattel Slavery. It is a "social class". (The Hebrews were not chattel slaves). (Callender 77) The word slavery in the Old Testament scholarship does not mean the same as the commonly held term "slave" by most western minds, especially when they equate the term to the experience of enslaved Africans in America, or other examples such as slavery in Liberia.

The reigning consensus has been that slavery in the ancient near east differed markedly from that found in classical Greek and Roman societies. Among the most

widely recognized differences is that which pertains to the property aspect of slavery. (Chattel slavery) (Callender 68)

Slaves were not "owned" in the near east, they were not seen as property. "In Babylonia, a slave preserved his identity and had a family, and his master did not have the power of life and death over him." (Callender 70) In summary, the systems developed in Greece, the Roman Empire, and America were much different than the Ancient Near east.

I would like to identify three major points regarding this experience, clarifying what is meant by slave, and shedding light on the Israelite experience in Egypt,

1. Slavery in the Ancient near East is an economic status (resulting from the reality of not owning the land).

Slavery in the Ancient Near East might be better understood in the economic sense. A slave was someone who did not own the means of production [the land] in a civilization or culture, and thus had no other option but to work for someone else.

Diakonoff (via Callender) finds that there are three types of relationships to production and to property in the means of production in ancient near eastern societies.

1. Those sharing property rights in the means of production but are not partaking in any process of production.

2. Those sharing property rights in the means of production and partake in the process of production in their own interests.

3. Those who are devoid of property in means of production and who take part in

the process of production in the interest of others. (Callender 69)

This third section would include all types of slaves (chattel slaves, patriarchal slaves, helots, and serfs.) Diakonoff finds that the term "slave" in the Ancient Near East appropriately fits number three and this should be the understanding of the term that describes the status of the Hebrew people. Because of their lack of private property [the land], the Hebrews were considered slaves in the Old Testament. They were devoid of ownership in means of production and took part in the process of production in the interest of others.

2. Slavery in the Ancient near East was psychological and maintained through religious ideology of "why" non land owners were required to work the land.

Civilians in the Ancient Near Eastern Civilizations understood themselves as "servants of the gods." The myth or narrative that the people believed was , in exchange for the gift of existence, they were obligated to work [the land] for the gods. The story insisted they must provide agricultural goods. This "service" also involved the construction of public works projects such as irrigation and temple construction. "The religions and religious overseers of these societies typically were used to legitimize the ruling economic and political powers." (Mason 5) (Callender 72)

> *"Service" of course, was precisely what was required of people in the near eastern societies in their existence and slaves of the gods. . . indicate to people general servitude to the human as well as divine rulers. (Callendar 77)*

3. Totalitarian political powers in the Ancient Near East forced slaves to work the

land they had a monopoly on.

Not only were the Hebrew people devoid of private property and brainwashed into thinking that work was the ultimate purpose in life, the political powers of the time, through brute force totalitarianism, forced the Hebrews to work at extremely high demands. The aspect of forced labor was accomplished both through ideological oppression and political violence by threat of not receiving food (economic leverage). This all occurred despite the "freedom" of the slave to have a family and identity (when compared to chattel slaves) i.e. a private life of their own. "The Hebrew 'slavery' in Egypt was a systematic program of imperial oppression." (Callender 78)

The concept of forced labor [through lack of ownership---and political might] is more instructive in addressing this in injustice issue [of the Hebrew slave] than chattel slavery. It has potential to be as severe as any form of servitude and therefore, troubling from a human standpoint. Second, it is this type of slavery that forms the real background of the exodus in the exodus narrative. (Callendar 3)

In this sense, if the Hebrews did not own any aspect of the means of production the land, how else would they make a living other than working for others? If the ownership of this capital belonged to the elite rulers of the day, then all aspects of their social dynamic would be vested in these rulers.

Wage labour and the Issue of Employment

A picture begins to emerge, that what the biblical literature calls "slavery" is nothing more, [with the exception of the physical forced labor aspect (perhaps we,

modern people, have other passive aggressive motivations)], than employment - once again putting our conversation in modern contexts. I do not seek the tremendous task of trying to prove or disprove whether employment (like nation states) is universally right or wrong, as it is highly subjective and may be necessary or even desirable in some cases. Yet the questions may be proposed - is their more dignity in being an owner or a worker? Is there more liberty in being an owner or a worker? What is power and is power linked to ownership? And even, what is the relationship between low wages and poverty? etc. I would like take these questions to the Torah and see what it has to say about the matters, and I will seek to demonstrate that the Torah, between the lines, provides the case that ownership of the means of production, or the land, is a "god" given right, and absolute necessary component of its morality on life, and the morality on which all socioeconomic systems should be built.

These questions and argument for such "between the lines " values, will be elaborated on in our next section which focuses on Hebrew social policy, namely, the Hebrew cultures foundational policy that every Hebrew was guaranteed ownership of the means of production (capital), in their case, land. And with this, the guarantee that each family has the capital necessary to sustain its own existence, for eternity.

Also, with the decentralization of ownership, the possibility of an oligarchy (a few owning enough land to require the hiring of laborers in order to achieve production requirements or surplus) becomes obsolete, eliminating the potential of monopoly and a stratification of society. (Based on the idea that a monopoly of land results in centralization of power and authority). As we recall, in the case of the Hebrew experi-

ence in Egypt, the centralization of economic capital (and thus power) in the hands of the few *did* lead to abuse and poverty.

Perhaps the issue of employment is a temperamental issue, in the sense that so long as the contract is tolerable, employment will go un- criticized. In the Hebrews case, they did experience forced labor, lack of ownership, and excessive working hours in exchange for a menial, poverty stricken existence. Perhaps from their vantage point, the Egyptian slave situation can be perceived as unjust, tainting the notion of slavery or wage labor (or employment) for them all together. After all, in their case, the power of totalitarian regimes can be linked to monopoly (on the ownership of land capital), wage labor, unjust allocation of resources, totalitarian rule of economic systems, and oppression. It is up to the reader to decide if these issues can be linked to land (or capital) centralization normatively.

But the question remains, does wage-labor lead to poverty normatively? This again may be another issue too complex and beyond the scope of this paper to be addressed effectively. Then again, in what cases in the history of civilization does the absolute ownership of land (capital) by a elite -and the subsequent need for laborers- not result in abuse and unjust allocation of resources to those laborers? Thus the thin possibility of a benevolent dictatorship insuring equal distribution to the workers that create the wealth is perhaps a non sequitur and oxymoronic for isn't dictatorship not an unequal distribution of a power, both a wealth and a value? And what is benevolent about injustice in power distribution? As we may see, perhaps correlations between land monopoly and abuse of power were conceptual associations and ideologi-

cal links that the Hebrews themselves made. Can we assume, by their desire to leave Egypt and through the analysis of their own revolutionary social design, that they were of the opinion that the very notion of land centralization (or capital centralization) is unjust and unacceptable? We will attempt to prove the theory that the Hebrew did in our next section when we examine the various Hebrew social policies.

Our modern era has its own worn out examples, i.e. the criticism of corporate Capitalism where 1% percent owns the wealth yet 96% do the labour. Or Communism, where a ruling party (state) owns all the capital, reaps all the benefits, and each member gets paid equally despite the effectiveness of said individual's labor. Tough talk that criticizes these socioeconomic institutions are the foundation of all labour movements and huff and puff of "total economic revolution".

But what distinguished the Hebrews is their pronounced 'acting' on their rationale and their presumed theory (albeit established by sound scholarship) that to eliminate slavery, wage-labor – and the potential of impoverishment of workers through low wages, the Hebrew society guarantees capital to everyone. This results in the decentralization of economic power, the result of this decentralization inhibits centralization of ownership, monopoly, and finally, the effect by which decentralizing power you inhibit the tendency towards unjust allocation of resources (poverty).

When we begin to dissect this system, we will see the relationship between two types of pre-monarchic socioeconomic policies. The policy of decentralizing land (capital) – vesting economic power in the hands of individuals – in this case the family and self-sufficient farms, (the Bet-ave) and policies that protect and preserve the family

farm against social and environmental setbacks– whose breakdown results in centralization.

For example, if the Hebrew family farm (or business) fails in providing the necessary sustenance, members have no other option but seeking employment in another Bet-ave. Further examples are: personal setbacks: a broken leg, social setbacks: loosing family members to war, and environmental setbacks: crop disease.

In other words we will examine two tiers of policy: policies that guarantee each person land (capital) and policies that enable the productive potential of each land-based-self-sufficient system against setbacks – environmental, personal, social or otherwise.

In this section, we hinted at some observations that early Hebrew society was built and maintained a decentralized society upon values of human dignity. If the first part of this paper was establishing literacy of the Bet-ave (a decentralized extended family landholding) and the second section about the rationale and Hebrew society may have valued a decentralized socioeconomic system, the third part of the report seeks to elaborate and defend such premises through examination of land use policies and the additional policies and measures that were put in place to maintain the system (against setbacks). We will be observing how the various policies worked together to ensure these established values and protected from threats to ongoing sustainability.

MEASURES

5

5 Methods to ensure Bet-ave's stability

As concluded in the previous section. Israel's experience in Egypt lead to a restructuring of society based around self-sufficient family farms, presumably out of a need to eliminate the experience of wage labour and the discomfort of being dominated by a ruling class… in a *reactionary* sense… and that this society was built in order to ensure liberty and human dignity in a *proactive* sense through ownership and control of a self-regulating means of production. It is important to note how revolutionary of a system this was at the time:

> *We do not know of any other decentralized land use structure that came into antonymous existence in historic times in that region (Gottwald, 4) No other examples can be discerned as a direct movement from the under classes that broke through the existing state structure and social stratification in order to create a comprehensive alternatively structured sovereign community (Gottwald, 4)*

Another noteworthy aspect of the community is that members collectively selected a leader on their own free will and accepted responsibility to implement the system on a individual basis. (Boer ,12) We have noted in our previous section that this passion and internal drive must have been rooted in their collective experience of being slaves as well as the strength of the family structure.

This section of the thesis begins to redirect our questions to the nature of the socioeconomic order's implementation: How were these ideals, which are presumably difficult to maintain and sustain, designed into a socioeconomic system? When we

begin to explore the socioeconomic policies that the Hebrews enacted to maintain the federation wide "family farm" or subsistence agrarian system we simultaneously support the proposition that Hebrew ideology valued decentralization based on principles of human dignity and was revolutionary both in theory and in implementation strategies.

The Land

One of the things that has been reiterated over and over in this thesis is that the Bet-ave (family, production unit, governmental authority) was the basic unit of Hebrew culture and society. That being said, the basic foundation of the Bet-ave was the "land." The land(or capital) is the pivotal factor in the success of this self-sufficient socioeconomic system. Yet seeing the land as the key tool is not to forget what the tool serves, human autonomy and liberty through cooperation along familial bonds and self-sufficiency.

The Promised Land

After the exodus from Egypt, the biblical narrative states that the Hebrews wondered for forty years as nomads. This nomadic lifestyle was difficult for the Hebrews and resulted in "grumbling". One of the key visions of hope that sustained them was the idea of the promised land. We sometimes think of the promised land of being simply territorial borders, but another reading implies that it was not just land for the society as a whole but the promise of an allotment of land for each family - the promise of ownership of land- that "Every Israeli was to have land and keep it. This was the original premise of the "promised land" "(Issues, 1) This notion was revolutionary as the

traditional pattern of land ownership in the kingdoms of Egypt and Canaan was one in which a wealthy family or aristocracy owned all of the land and society was stratified accordingly. (Samaha, 3)

The pivotal methodology of ensuring land ownership is the land policy that everyone should have the right to ownership. There are two main principles in this land policy that establish the right to land ownership.
(Leviticus 25, Num. 26:52-65)

A. The land was to be distributed equitably.

B. The land owned by families was inalienable.

As we have established: land was the chief means of production, the difference between wealth and poverty in pre-classical times. (Samaha, 3) And in the case of Egypt, as well as now, an entire economy could be controlled by a few powerful landowners who could subject others to tenant farming. (Samaha, 4) The Israelites saw the equal distribution of land as a measure against the systemic presence of poverty, as well as mitigating the unfortunate drudgery of being the client in a patron client relationship. Especially a relationship that resulted in horrific forms of slavery. Therefore the equal division of land is the point of departure of the system of social economy of the Hebrews (Mott, 1)

The laws are stated clearly enough. Consider Leviticus 25: 23: "Land must not be sold in perpetuity, for the land belongs to me and you are only strangers and guests. 35 : You will allow a right of redemption on all your landed property." (Boer ,9) Within this verse are two instructive points in regard to the Israelite land tenure system.

1. Land cannot be bought and sold (only leased)

2. Family land has the opportunity to be redeemed.

This concept is the foundation of all Biblical teaching and revolutionary in that there is no documented presence of such a policy in all the cultures that existed prior to the time of Moses - nor is it ever formally recanted in the rest of the Hebrew literature. It may be the foundational scripture behind the notion that the Hebrews are 'the light to the nations', via this land use policy.

Some scholars note that this core policy and notion of social egalitarianism is repeated and reinforced by the prophetic teachings which serve as an accountability strand in the history of biblical literature in times where the policy was ignored or abandoned. (Boer ,9)

Land is a right to an entire bloodline (to all future generations of a family), not just to the current generational family administrators. Embedded in this policy as well are notions of being a sojourner, a guest, or a visitor of the land. This implies land was not something to be claimed, fought over or disputed, but land was a privilege whose steward looked after and cared for on behalf of all future generations of the society.

If the land was such a crucial part of the system, then it is fair to assume that proper management of the land must be included in the process of providing resources, namely that great care would need to be given to prevent it from being over developed or overworked to render it useless. In fact there are perceptions in other parts of Leviticus 25 (called the sabbatical) stating that every seven years the land had to lie fallow in order to recover. This is an ancient form of sustainability, and it can thus be concluded that land stewardship was also a Hebrew value (for economic reasons at

least).

Division of the land

Along with the legislation in Leviticus is the notion that the land was divided by lot. The methodology of land division was taught in Mosaic law (Claiming, 1)

The modern word "lot" , a term used to describe current land unit and real estate subdivisions is a derivative of this ancient usage. "The Greek word usually translated "inheritance" in the Bible means a division made by casting lots. " (Claiming, 5)

The process outlined in the text was as follows:

> *They began with a census of the tribes and families before the conquest (Num. 26:1-51). Every tribe, excepting Levi, and within each tribe every family, was to receive its proportionate share, according to size (Num. 26:55-56), and ultimately, to ensure fairness, by lot (Num. 34:16-29). The actual distribution, according to these provisions, was concluded at Shiloh (Josh. 19:51). According to ancient historian Josephus, the territory was not divided into shares of equal size but of equal agricultural value. The landmarks that protected these allotments were protected by the public and solemn denunciation of a curse against anyone who should dishonestly tamper with them (Deut. 27:11-16; 19:14). (Claiming, 1)*

As mentioned, this division or lot was given to each extended family (Bet-ave) and was to remain in that family forever. This land could not be "sold" nor could additional land be accumulated, except temporarily (which we will examine). (Claiming, 5)

Measures to ensure equal land division

As we have mentioned in the introduction, there is a corollary between centralized ownership and the slavery-client spectrum. As ownership centralizes in the hands of

the few, society becomes stratified into classes, and with that, the degree of economic liberty. The concentration of land, even marginally, could disrupt the egalitarian balance. (Claiming, 1)

One clear caveat was mentioned in the scripture, that "you have the right to redemption." (Leviticus 25) which implies that in certain scenarios one may defer their land to another family. We mentioned cases where the homestead could be compromised or mismanaged. What would a family do in such a situation? One of the things mentioned in the most recent (Claiming) quote was that there may be instances where temporary landholding rights would be transferred. Undoubtedly, "it is easier to devise a one-time fair appropriate of land that is to keep the system from falling apart (Claiming, 1)

Therefore it was in *principle* no one was to be poor (self-sufficiently impotent) in Israel (Deut. 15:4) Although each family had sufficient land to support themselves circumstances may limit such possibilities.

Let's explore what it would mean to lose possession of land or to defer responsibility temporarily.

The Risks associated with the system

One of the keys to understanding how maintenance worked is to understand the risks or threats to a system and those policies that (conversely) preserved the right to land ownership over time, despite setbacks. Brother John Samaha has spoke of these risks in various ways:

1. Equality was established in general condition, rather in personal positions. Inequalities themselves were not prevented. (Mott, 1)

Rationale: They arose from different qualities of soil, personal capacities and effort and the caprice of nature (Mott, 1)

B. Crops were not always sufficient.

Rationale: Raiding nomads, wartime incursions, oppressive taxation by despots, and natural disasters were regular occurrences. . (Samaha ,43)

D. Setbacks and disaster were always threatening the small landowners who were subsistence farmers. (Samaha, 3)

Rationale: Some social (injury, death, incompetence) and environmental factors are always working against success in a self-sufficient lifestyle that produces only enough to maintain a basic livelihood.

Yet through acknowledging these realities, Israel put in place a series of policies that were radical in their nature by today's standards and were essential in the maintenance of the system. There are two sets of policies that I would like to quantify: the first is what I am calling hard policies, that coincide with pure legalistic requirements, executed at specific points of time. The second are soft policies that effect market forces by prohibiting the exploitation of the poor in times of trouble.

Hard Policies: The Jubilee

The jubilee to ensure land distribution

The most obvious and revolutionary social policy was a law that fell under

the heading of the jubilee. The idea of jubilee developed as an economic strategy to protect the Bet-ave's right to land and its self-sustaining infrastructure (the land) (Samaha,3) It existed to prevent the economic collapse of the entire system by creating support measure for individual Bet-ave units. (Samaha, 6)

During the jubilee year three major events occurred, and we shall explore each and how they work together to ensure the liberty and dignity of individuals and families. The origins of the world jubilee means "year of the horn" as the a horn was blown to proclaim the beginning of the jubilee year.

The jubilee happened every 49 years. During that year all original land ownership rights (established at the federations inauguration) were restored. Interestingly, this time period coincides with one generation (of family)- so that if one generation was inadequate in achieving self sufficiency, the next generation had the opportunity to do so. (Samaha, 2)

It should also be clarified that during the 50th year, in conjunction with the already mentioned sabbatical years, the land had to lie fallow, which harkens back to an earlier point that this "fallow year" was a sustainability measure to prevent the land from being overworked and rendered impotent. (Samaha, 2) (Spira-Savett,11)

The jubilee enabled the continued restoration of the original land division. This maintained the emphasis of human dignity through the ownership of the means of production and protected the extended families from the failings or misgivings of the earlier generation. What was the point of advocating the egalitarian life, and family oriented production, if the entire system fell apart once one family experienced eco-

nomic setback ? (Samaha, 6)

The laws of jubilee preserves the land division system by maintaining that the property stay in the family upon which it was originally allocated too via its 50 year "re-set button" (Sanders, 4) Through which it prevented the social stratification that would result if over centuries, more and more units failed at the goal (of self-sufficiency) which would in turn result in the centralization of land into the hands of a few families.

But two other things happened during the jubilee which also point to the over arching value system explained in our introduction: the redemption of wage labourers (Leviticus 25:14,25,35) and the forgiveness of debts (which coincides with the sabbatical years), both which help restore the system. Wage labour, which is the inevitable result of a family who fails at achieving self-reliance, and debt, which is a force that if not managed properly could also lead to a forfeit of land ownership (to pursue labour to pay off overwhelming debt). (Sanders, 4)

In the sabbatical years(every seven) and Jubilee years (the seventh, "seven year", in a cycle) all debts were forgiven, we will explore the function of debt in later sections, but the key take away is that in an economic system oriented towards livelihood and underproduction, debt would be an even more burdensome state of being as there would be virtually no opportunity to create the surplus to redeem yourself (interest on loans was eliminated due to this issue, also explored in later sections.)

The leasing nature of land forfeiting

In scenarios where families had to defer their land and go into servitude to

another family, this was called a lease. Even leases had certain limits that would increase the probability that they could be redeemed even before the jubilee. As well, the leases had a diminishing price associated with it, so the value of leased land would decrease over time (Leviticus 25), limiting the potential of the lease holder to amass wealth off the property or inadvertently increase their dependency of the leased lands. Surely a land manager who knew his land was decreasing in value over time, and who knew that it would eventually be taken back from him during the jubilee, would not put a large capital investment in a product that would have such diminishing returns.

According to Lev. 25, when a family wished to lease their land the contract or leasehold indicated that it would expire in the year of the jubilee. This is radically different from the concept of selling land in modern society and that is why scholars argue against the use of the word "sell" in transliteration. (There are three exceptions in the Bible where a perpetual title was acquired by purchase.) (Claiming, 6)

Under the normal laws (outside jubilee) the family had the right to acquire back the land at the price of land at the current year of the lease. If the family elder himself could never meet the demands of the lease, it was permitted that his son do so. (Leviticus 25) This sort of activity implies that even within the Bet-ave, although families collectively owned the land, that there may have been private financial management between the different family members.

Jubilee: forgiveness of debts, release of slaves

Another key point is the forgiveness of debts during the jubilee (but this also happens during the sabbatical years - every seven), in modern times this can be re-

lated in some way to a statue of limitation or a bankruptcy law. In the sabbatical years, the liability for the debts are relieved which enables the entire family system to start life anew without the fear of creditors. At first glance this may seem odd or unfair to the "wealthy" but we have to remember that this is an egalitarian society and stratification was not valued. It was in the interest of the users to have such policies (as bankruptcy) because of the fact that this preserved the egalitarian system and eliminated the centralization of wealth.

The sort of flippant dealing with money, or not wanting to profit off of others' failure, harkens back to the idea that members of the federation saw themselves as a family. Who, even in our modern capitalistic culture, wants to rip off a family member? (Sanders, 5) The sabbatical years of debt cancellation and the jubilee policies are linked to a wider ideological value of family and the duty to help one's family and kin in hard times. (Mott, 1)

Soft measures

We have, so far, established the fact that even though Hebrew society ensured that everyone had equal access to the means of production (by guaranteeing land ownership), circumstances could make retaining land difficult in the face of economic pressures and one's ability (or lack of ability) to produce basic life necessities. In response to circumstances that compromise a Bet-ave's success, family members had the ability to lease their land and enter into a work contract with another family. We have also established that these unfortunate families had the right, at any point, to get back

their land and if they could not do so, it would be given to them in 50 years without a charge or debt associated with it. These are what I consider hard line policies to ensure people indefinitely have access to land and legal rights and opportunities to keep it.

I am now interested in turning our attention to more soft measures to ensure land tenure through the fiscal system:

The Hebrew law gave three additional economic restrictions. Each of these polices prevent people from amassing excess wealth from their lands or lands that they lease. Aside from this, people were free to develop the economy. The three laws are:

1.) A standard price for land rental (Leviticus 25, Leviticus 27:16-18)

2) prohibition of food profiteering. (Leviticus 25:35-37)

3) restrictions on the use of interest (Issues, 1, Leviticus 25:35-37)

A fixed standard price for land rental

The Jubilee took the profit out of landholding as such, leaving no incentive for speculation and removed the root cause of poverty from the Jewish society (Claiming, 1) The whole idea rests on the notion that you could not make money out of renting extra land and then selling people its surplus goods at a profit (which may increase the debt of the already insolvent wage labour families). To maintain the system of equitable distribution, Israelite law did not allow the land to be bought and sold as a commercial asset. Therefore, there was no such thing as land speculation, i.e., viewing land as an abstract commodity.

Leviticus 27:16-18 was additional incentive to hold it and not even rent it out. A farmer could earn between 27-81 sheckles a year compared to only one shekel if he rented it out. This was also much more than a seasonal laborer could earn in one year (at most 25.5 sheckles) witch such a clever benefit in holding and owning land, there would be no sellers or renters (Issues, 1)

Prohibition of food profiteering.

Besides the fact that was land unavailable for purchase, and there were price caps on rental fees, there was also prohibition to making profit on the produce of land. (This is distinguished from other profit making opportunities.) The sale of food at a profit was illegal. This may seem like a radical idea but held in conjunction with the rest of the concepts it becomes clearly practical. Going back to earlier discussion that the society was based on production for livelihood, it would make no sense for someone to produce a surplus just to sit and let it rot. In our society, people produce more than what they need for the purposes of making a profit, and this profit is an incentive for working more than what your "self-sufficiency" requires. In the case where profit on food is prohibited, it takes out all the incentive in over production (also benefiting land potency), this also prevents people from setting up markets to people who have leased their land. This means that people will have to work with other land owners for their well being as opposed to just buying the food with debt. (Issues, 2) The law is clear enough : 'You shall not [...] lend him your food at a profit. (Leviticus 25:35-37)

Charity

Free pickings

We have mentioned before that there is a sustainable component of Hebrew land management: that is every seven years the land is to lie fallow. This policy also coincides with the economic sustainability of poor people. Exodus 23:10-11 requires that any volunteer crops or natural produce of the land that grew during sabbatical years was free for the taking, especially by the poor (Deuteronomy 15:1) (Samaha, 4)

First fruits

Another system in place were the "first fruits", where the first harvest was given to the priests and redistributed to the poor. (Callender, 79)

In the field

There is also a law that says that the corner of the field are to be left unharvested and this section was to be available to the poor. This also applies to fruit that naturally falls from the vine: if during a harvest a farmer missed a section, the poor could go back to redeem it. (Spira-Savett, 2) Surely, both of these measures relates to the fact if the harvester realized they had more than they needed for self-sufficiency, there would no incentive to put in the effort to harvest the rest of it do to the fact they could not make a profit with it anyway. Excess would be diverted to the poor instead of let to go to waste.

Threshing floor

When the grain and the fruit fell during the threshing, any waste food that was still edible were given to the poor, strangers, widows, orphans, and the traveling members of the priest class (Spira-Savett 2)

Naturally growing food

Any naturally growing food was available to all and especially the poor (Spira-Savett, 11)

Food policies working together

All of these various food policies seems counter intuitive: on the one hand we have a risky socioeconomic system geared towards ensuring the private ownership of property (in families), and in the other hand laws prohibiting that profit is to be made from food production. It must be noted that despite the emphasis on private property, there was not an emphasis on food profiteering. According to the Hebrews, it was food profiteering(store housing) that created the circumstances for slavery/ wage labor. Although it may be worthwhile to state that there are indeed other types of profit generating activities within the community, it is clear that the main objective is self-sufficiency, and therefore additional profit making activities may be limited to available time once self-sufficiency has been achieved. Therefore it can be concluded that the Bet-ave was more similar to a lifestyle farm than to an entrepreneurial farming venture.

Restrictions on the use of interest

Lending is strictly regulated in the Torah. Loans are permitted and encouraged when the objective is to help the poor(Deuteronomy 15) but there are to be no loans with interest. Loans also take on a whole new meaning when fiscal policies are created to benefit the Bet-ave and develop and support the socioeconomic system built upon

it. When loans are permitted it is not for commercial development but only for those who are in need. We can note that many, perhaps a majority, of loans in our society are speculative and fall beyond the bounds of self-sufficiency.

Interest grows exponentially and therefore was disallowed inside the country because it was seen as something that burdened poor people, not helped them. Working to pay off interest brings pressure on land and people to produce more. (Issues, 1) This is congruent with the anti-surplus policy. Policies which reduce the production of surplus either to make a profit or to pay off debt work to preserve the land because both scenarios result in land being over worked. The inevitable result of these scenarios is wealth being transferred up the chain (centralizing) and creating class stratification. (Issues, 1)

PRELIMINARY CONCLUSIONS

6

SUMMARY OF VALUES

Human factors

Goal: Self-Sufficiency
Objective: Provide all survival based goods and services.
Rationale: It engages in activities that are required for its own sustenance. (ANV) When a village takes on additional economic activities (for export) it becomes a town, (scaled to the degree of additional activity it undertakes.)
Goal: Growth Boundaries
Objective: Limit to 100 persons (Bet-ave) or 300 for village.
Rationale: The size of a traditional village is normatively scaled for a 300-400 person carrying capacity
Goal: prevent economic centralization
No food profiteering
Equal division of land
Goal: make land ownership inalienable and wage labour in principle discouraged
Cannot by or sell land (only leased)
Likewise you own labour could not be sold

Goal: prevent wage labour
Restriction on use of interest
Equal division of land
Redeem wage labour debts
Measures to help poor (labourer)
- Free pickings
- First fruits
- In the field
-Threshing floor
- Naturally growing food

Low impact development

Goal: Reduce material import
Objective: Utilize the existence of on site building materials
Rationale: The presence of topsoil, sand, gravel, wood, and the potential to grow bio based materials (bamboo, straw bale, and switch grass) for construction will diminish dependency on external resources.

Energy

Goal: Maximize Passive Energy
Objective: Develop meta-site environment to allow for direct gain and passive cooling.
Rationale: Developing the village site design with access to these resources will enable passive systems to function effectively at the individual architectural unit level.
Goal: Reduce heating loads
Objective : locate trees to block winter winds
Rationale: because Muncie is located in a zone for heating (see image) moves that prevent northwesterly winter winds are encourage through the placement of forest masses in the northwest sides of the site.
Goal: reduce cooling loads
Objective: locate homes and village structures north of major water bodies
Rationale: summer winds in the Midwest flow from the south west. If water is positioned properly these winds can be cooled while traveling into the heart of the village.
Goal: Develop water resources on site
Objective: create ground/surface ponds to collect necessary water usage (see framework)
Rationale: The on site collection of water allows for self-sufficiency. Choose

locations identified as pooling locations based on soil type.
Goal: Conserve water
Objective: rainwater capture and reuse, solar hot water heaters, grey water capture and reuse, living machines and run-off water treatment
Rationale: Water is a resource and requirement for sustainability (see framework)
Goal: Treat waste on-site
Objective: Develop waste processing facilities (living machines) and designate compost areas and additional waste integration.
Rationale: Choose locations based on gravity fed systems or on soil types that create greatest opportunity for waste integration.

Preservation

Goal: Preservation
Objective: Control run-off and use buffer strips on hardscapes, riparian buffers. Habitat systems.
Rationale: Preserve existing environmental conditions where possible to reverse environmental degradation trends and look for opportunities to regenerate native ecologies.
Sabbatical: land lies fallow (7 years)
Prevent overproduction
Prevent food profiteering
Prevent wage labours
Objective: when possible use low impact farming techniques like permaculture to regenerate land.
Objective: utilize erosion control techniques in designated traditional farming sites. Contour farming, no till etc.
Objective: separate industrial farming operations from city center and residential areas.
Objective: conserve energy and labor through location
Rationale: the permaculture principles will be located near to the main residential structures and village center while the large farming centers will be located far enough to create separation from the industry but near enough for easy access. This is also a gradient for the most intensive purposes and demands.

6 Report Conclusions

As we discovered in the Pre monarchic Israel report, a key factor in the Hebrews relationship between the environment and their technology was their social system values. The Hebrews used their social ideals as drivers to determine their land-use patterns, infrastructure and general life-support system design. And conversely, they did not permit infrastructure to determine their social order. The economic independence of the Bet-ave was the driving organizational principle. We can identify three key values that drove Hebrew social design and which supports the idea that the Bet-ave was the ideal foundational unit for their social order.

Decentralization

Growth boundaries - the family

Self -sufficiency

We also noted throughout the report that there is a key component of sustaining the lands productive potential and therefore we have a third category of environmental sustainability.

Preservation / sustainability

The summary outlines these policies and adds contemporary elements that can be added rationally when considering what would be required for contemporary contexts (to implement said goals).

The landscape for the ancient Hebrews, and likewise, our contemporary adaptive reuse of their principles must be an expression of these normative values and by and large mimic the ways in which their society was broken down into these basic economic units (Bet-aves).

Mimicking the Hebrews in their own organization, this project will look at the Bet-ave as the organizational driver in regional (village planning) and site specific design decisions. In both cases, the question of what *was it's spatial and systemic dimensions* must be answered. This is a problem because nowhere in the literature does it explain the size of land allocation aside from allocating according to need. What was the need and therefore the spatial footprint to support it? The next section of this project will outline the problem in further detail and outline the methodology for solving it. Once the Bet-ave's spatial footprint is calculated and adjusted to reflect contemporary demands we will use the spatial unit as a land planning tool to determine the placement of Bet-ave within a large scale site boundary.

Key limits scope and limits of project

But before we develop a contemporary site design based on the Bet-ave self-sufficient unit, we must address other key design values that are beyond the scope of this project. There are two other major design policies that can be pulled out from the pre-monarchic study but because these are more "ethereal" (rooted in governmental and market policies) these are more difficult to deal with. Hence the need to limit scope. However, I do wish to ask questions of these design issues and speak to potential solutions or of directions for further research. While I am proposing certain

opinions, these recommendations should been seen as speculative as there has been no formal research into these value areas (in a contemporary context) and no literature review conducted on behalf on such inquiries. Therefore, the following are examples of design values, discovered in the report, that will not be addressed in the site design process.

Wage labour

Antimonopoly

Interest free loans

Lease cancellation

Bankruptcy

Charitable actions

While the Bet-ave, and the division of land into family allotments is the foundation of Hebrew culture, it would be foolish to believe that by *simply dividing the land* according to Hebrew principles that a re-institution of ancient Hebrew in contemporary culture would be achieved. As we have discovered, the success of the Hebrew socioeconomic system was dependant on judicial policy and restoration mechanisms for its over all success. In some sense, the revolutionary nature of the society *was* these additional policies and mechanisms. Therefore, to create a design program that excludes these considerations is to fall short in claiming that this project proposal achieves the "authentic" adaptive reuse of Hebrew socioeconomic order.

If a contemporary establishment of Hebrew socioeconomic values were to

achieve a measure of success on a nation wide scale (worthy of the name and comparison) it would need such policies in order to prohibit the type of setbacks that would compromise the intention of decentralizing society into Bet-aves. The forces of wage-labour, debt, centralization and monopoly are strong in American society and simply building self-sufficient family farms is not going to off set those powers.

What to do with the polices?

Identifying the policies in and of themselves have been instructive in making the case for the rationale and values of Hebrew society. While they are helpful to instruct us and help support the claim that the Bet-ave was revolutionary, without them, the special nature of the Hebrew Bet-ave loses it power.

Furthermore, land designers, by establishing "place", cannot control the users of any project. So much depends on people "buying into" the idea and acting in accordance with the established vision, just as was the case for the Hebrews. There are countless examples of community planning projects in design history that, despite ideal visions, were never built to specifications nor used as the designer or community intended.

In some sense, not only are the policies beyond the scope of this paper, they are, to a degree, beyond the scope of the landscape architect. While there are countless precedents of land design firms also leading policy initiatives, the potentially sophisticated and modern market and governmental programs required to fulfill these values are beyond any generalist. In the case of a modern developer actually going

forward on this proposal, consultation of policy designers would need to be employed.

While Landscape Architects and Planners, especially those who are looking at large scale regional and community planning strategy and design, have considerable influence on how land is used, design firms ultimately, do not have the ability to regulate land ownership rights and prevent market mechanism usage without engaging the judicial process.

For the landscape architect, land design is the primary object of the designer's power to influence. Although all designers, like all citizens, have the potential to effect change in all dimensions of society at large – site designers are given the specific privilege to influence what happens at the land planning and design level. All other objectives and goals in the "ether" of social dynamics are subject to the permissive or absolute will of the 'people' as a whole, or the social engineers of the age - both of which are limited by the social acceptance of the mass culture. That is not to say that there can't be people that are trained as landscape architects *and* as law and policy specialists but this is not what this author is trained to be is nor will he presume to be otherwise.

At best, the author is limited to speaking to and of the cultic, economic, environmental, government, and military values/dimensions of society in the design expression of *aesthetic*), thus, as mentioned, the only real dimension of the Hebrew socioeconomic order in my power to design and build is the Bet-ave's site plan and land distribution map. However, I will offer thoughts and recommendations in the other dimensions.

SOME KEY OBSERVATION TO GUIDE THAT PROCESS.

The first elephant in the room is financing. Each farmstead, in a net-work of farmsteads, will be in tremendous initial debt. This has the potential to interfere with the set of policies that involve charity.

While It is important to note that self-sufficiency, outside the context of a unified federation-wide effort such, in of itself, does not require charity as an operation. In fact, the notion seems contradictory. The reality of farming in general is tough work with marginal economic gains even for farms that have a for-profit purpose. Nearly all major conventional farms in American culture are subsidized by the government. Often times, small scale, or specialty crop operations also fail to survive on such small profit margins. In fact, farming is risky business.

One of the things that set apart the pre monarchic community is the fact that it was able to provide a support network, with the marginal "profits" it did have. However, the Hebrew culture did not have the start up costs that contemporary Bet-aves would require nor did it have to pay taxes to a state and federal government as contemporary Bet-aves would ,more than likely, have to do.

It may be a big challenge to ask Bet-ave communities to rely only on themselves for financial support and if Bet-aves do in fact seek additional support outside the community (farm subsides, grants, private donations) with it comes a whole list of ethical concerns.

Furthermore, if you are limiting the Bet-aves to internal financial support how do you coordinate that effort? One might consider credit unions or small localized

banking institutions. But how exactly, would they loan money they don't have (and without interest), while already being in debt themselves. You could not call the contemporary community an adaptive reuse without there being some sort of systemic assistance policy or program.

In terms of being "profit producing" the laws against food profiteering do not limit other type of for profit venture, and furthermore the non-profit food policy did not seem to apply to "foreigners"

There would therefore be potential for making profit off of non bet-ave'rs but where is the balance struck in terms of economic activity within the community? Will the community members have the time to work outside of the compound? How much time can be allocated to additional programs outside of self-sufficiency? If the community was not self-sufficient and focused on profit making (however solvent), it could not be considered authentic. It would not be good enough to be a net exporter. The Bet-ave would have to be *only* exporters.

What about farm subsidies?

While the opportunity for farm subsides may be available, it seems counter intuitive to develop a dependant relationship on the state.

Judicial Policy

Charity was not enough for the Hebrews to prevent centralization and preserve the Bet-ave. They also had to establish laws and polices that would prohibit monopoly or centralized systems. The limiting factor then would be to what degree would the contemporary Bet-ave rely on the American government to adopt and create specific poli-

cies for them using the American judicial courts to hold each other accountable, and to the degree that they could establish their own small governmental authority. Would that be permitted by the American government? What existing government charters exist that could be adopted to the contemporary Bet-ave?

Clearly there would have to be some sort of mechanism enforceable through law to prevent Bet-aves from capitalizing and/or profiting off other Bet-aves. And that is a justice issue. These judicial issues could be written into neighborhood covenants which are legal entities. But can neighborhood covenants have the authority to take land from people and prohibit food profiteering or, in the case of a violation, would Bet-aves have to go through American courts and would American courts support such contracts? What would the Bet-ave legal status be? A corporation? A NGO?

Hebrew egalitarianism's legal dimension at its core exists to prohibit other people from compromising a Bet-ave's ability to be self-reliant. While it is hopeful that people committed to the Bet-ave way of life would have the strength to act justly without judicial controls, even the Hebrew recognized the importance of an established judicial system.

If they avoided a symbiotic relationship with American judicial power, could they get permission to be a sub government or community? Would they also have to provide security, fire, ambulance services within the community? Have their own prisons, etc.? How would they interface with other government programs and American institutions?

There are many gray areas in the hybrid relationship between the contempo-

rary Bet-ave, the contemporary government or other quasi-government options that simply are not answered in this project.

Furthermore, perhaps each Bet-ave would be left to its own devices, or perhaps there would be a need for years of trial and error to find solutions that are consistent with Hebrew values. In any case, it is simply not in my power to recommend such a solutions. It may take sophisticated legal creativity to find solutions that you could authentically call "adaptive reuse" without establishing a new country altogether. Again, this is a type of creativity I do not have.

To end on a positive note however, for the purposes of gaining a better understanding of the material dimensions of Hebrew culture, a contemporary development using the Bet-ave, I believe, is still a worthwhile endeavour. After all, the spatial and cultural footprint and the organization of these footprints are the greatest expression of Hebrew religion, ideology, and ethics. These footprints are the common denominator of all social, political and economic philosophy and remains the key to understanding the Hebrew social philosophy and linking that social philosophy back to the existential fact of life: economics: food, land, and water.

Therefore, we are going to go forth and develop a model Bet-ave for contemporary purposes (to present alternative values, etc), perhaps it can be used as a visual model and a touchstone for those interested in ironing out the judicial and economic feasibility issues that would be required if such a large scale "family farm" effort were to be implemented in various geopolitical contexts under a rubric of Hebrew values.

PROBLEM

7

7 DEFINITION OF PROBLEM

Site design related issues

Going forward with the planning and site design of the Bet-ave requires calculating the scale of a Bet-ave using modern day consumption numbers (understood as a spatial-footprint for a 100 person complex engaged in self-sufficiency operations). Yet this task is not easy as there are various hermeneutic gaps. This section of the paper will begin to identify the gaps and propose rationales to fill them.

Aside from calculating the numbers, there are other issues that needs to be addressed such as form, aesthetic, and human and social factors.

The ultimate site design goal is to create a contemporary Bet-ave compound that would support an extended family, which ranged in 80-100 persons. But there are numerous ways to achieve that goal (via infrastructure) with a number of social and form -based configurations. Some of the most basic design features of the Bet-ave are unknown to us (architecture, site design, orientation, etc) For example, we have no way of knowing if the extended family households shared a large shelter structure, or if nuclear families had their own isolated homes. Or even a middle ground existed where it was a series of disconnected rooms that lead to a common area where the services were shared in common?

As for social factors, should it be presumed that family members worked towards self-sufficiency collectively or individually. The core issue is "boundaries" and if

they were drawn within the Bet-ave compounds themselves.

This question plays out at site design level. For example, would each individual nuclear family home (presuming they were divided in such a way) treat black water in individual greenhouses/living machines? Or would there be one giant central processing unit that treated all waste water in a wetland. Same could be said about farm land productivity, etc. – did each nuclear family have their own garden? Or were all vegetable production in one collective plot?

The question will, in the scope of this thesis, remain unresolved from a historical perspective because there is no clarity on the issue in the literature. Perhaps these types of administrative/day to day subdivisions and social technologies are best left to the potential (contemporary) residents of such a system and out of the hands of the designer.

If we were to "leave it at that" and be hesitant to proceed due to our ignorance, the Bet-ave design process would remain as a planning exercise and would not progress into site design (as the site design process requires decisions to be made about these technological pieces and how they are arranged).

In our site design goals and objective section, we will outline a series of site-design assumptions that answers these questions for this project– yet it must be noted that these answerers are from the opinions of the designer and are not grounded in biblical hermeneutics. Most of the proposed answers are relevant to contemporary issues and concerns namely environmental stewardship and social egalitarianism and are therefore rationale (both values that can be linked to Hebrew society – but clearly

thought about in different ways)

As a method of filling the gap, we will seek to develop spatial footprint numbers based on current self-sufficiency literature. As we will discover, the literature revolves around a five person nuclear household. Outlining the requirements at this scale allows to use the module as a multiplier when configuring the 100 person Bet-ave spatially. This module (as a baseline) can be modified when considering economies of scale. (This is also relevant to contemporary development context as nuclear families are dominant in contemporary Midwestern America).

As mentioned, a more detailed exploration of my specific design decisions is outlined in the Bet-ave development section and will involve my personal philosophy on how to create a space for 100 persons and how village groupings of these Bet-aves are arranged. But it must be reemphasized that even the contemporary homestead literature fails to inform past the "Bet-ave footprint" and therefore form-based site design decisions will be based primarily on my own ideas albeit highly influenced by the literature.

THE PROBLEM DEFINED

As mentioned in the introduction, the driving research question, when designing a contemporary development of Hebrew culture is: How was Pre-monarchic society organized and designed, and what were its it's spatial and systemic dimensions?

In actuality, this is really three questions :

A) *How was the pre-monarchic Israel society organized?*

B) *How was it designed?*

C) *What was it's spatial and systemic dimensions?*

The first question (A), as stated in our literature review and explored in the report, has been theorized by scholarship in the field of biblical studies, especially those scholars who are interested in cultural material exploration of Hebrew society. The overwhelming conclusion in our report points to the Bet-ave as the basic unit of society and organizing principle (which was independent yet clustered into villages) .The literature review section of this project sought to outline some of the relevant design goals and objectives, focusing on those relevant to the site design process.

Question B has been addressed in the conclusions of the report and will be further explained in the site design section of this project. In summary, there is little evidence to point to specific design guideline in the literature or in the archeological; record.

Question C is the core question which we will seek to address in this section:

The Bible, and its critical literature, despite going into the details of the socio-economic order via its social, political, and economic dimensions, does not speak specifically to the culture at the site design level. For example, although there are ample evidence for policies that guaranteed land being distributed to every family, it does not go into detail on how much land was allotted or how that land was managed and designed.

PROBLEM SOLVING METHODOLOGY

I will seek to fill this gap with other sources of information that reasonably answers the question; outlining the factors (energy, water, food, material, environmental, etc.) that must be considered when undertaking Bet-ave community design.

Furthermore, we must ask: what are the relative weights of those factors in constructing a theoretical spatial footprint of ancient Hebrew culture at the material level? I believe it is reasonable to assume that contemporary users require the same food, water, materials, and heating demands today as they did thousands of years ago.

Because of this, I believe that the literature that exists on contemporary farmstead and self-sufficiency theory can give valuable insight into the footprint of the Hebrew farming community.

SUBPROBLEM 1: WHAT IS THE SIZE OF THE BET-AVE?

Note that once the problem, what is the size of the Bet-ave is solved, this also solves subproblem 2, what was the size of the village?

The size of a Bet-ave is unknown yet rationally based on theoretical assumptions. A) In order to predict the size and scale of the Bet-ave one would need to know the consumptive requirements of a grouping of 100 people during the time of the Hebrews. The second is knowing/assuming B) the consumptive mediums (i.e. animals, vegetation et all) and the infrastructure required to sustain and grow/tend those mediums specific to the environment they found themselves occupying.

This would also be responsive to the type and varieties of food and water

resources specific the climate the Hebrews occupied. Thus, these two variables will be replaced with the conditions of the culture and environmental conditions of our development which does have established calculations. In addition, this substitution should increase the relevance of the project as this site is being designed for contemporary peoples with contemporary technologies and purposes. In our case, the consumption levels will be based on a frugal lifestyle of a Midwestern American family, and the infrastructure requirements to feed such a family on agriculture mixed with small animal husbandry.

> According to "Our Ecological Footprint" (a work that seeks to calculate the real footprint of typical North Americans) land usage is broken down in to the following subunits
>
> food – 3.3 acres
>
> housing (operation and maintenance) – 2 acres
>
> transportation – (2 acres)
>
> consumer goods – (2 acres)
>
> services - (0.7 acre)

For fitting these contemporary needs with the space and technology required for its sustenance we will utilize contemporary resources on homesteading and footprint requirements.

SUBPROBLEM 2: WHAT IS THE SIZE OF THE VILLAGE?

Like the Bet-ave, here is little textual evidence for the exact size of the Mishpochah sub clustering, yet this must undoubtedly be addressed as a factor in considering

/ developing regional sites.

Using the spatial framework of the Bet-ave we can assume the size of the village. We have an additional problem of not knowing how many Bet-aves were in a village other than knowing the number varies. There could be various combinations of Bet-aves in one set of Mishpochah (village-like sub cluster). While on the one hand we are acknowledging that there is a finite/determinate number of combinations of Bet-ave, the exercise of arbitrarily picking a grouping these clusters "essesentially" is somewhat of a moot point and for some distinct reasons. First, since the Bet-ave is economically independent there were be no incentive to centralize all the Bet-ave into one major village (in fact the clustering would begin to close off agricultural spatial requirements and lead to other problem issues such as space required for waste re-integration). Yet conversely, there needs to be some grouping for cultic continuity and protective purposes.

The operating assumption, or "takeaway", from these concerns regarding the Mishpochah is that the dispersal of these Bet-aves would be responsive to the environment – namely resource availability (i.e. fertile land, water resources, etc), and even more so for the Hebrews as their spatial distribution would had been far more dependant on natural features and less so by our modern engineering interventions like excessive grading, piping, centralized energy generation and distribution, and long range material transport.

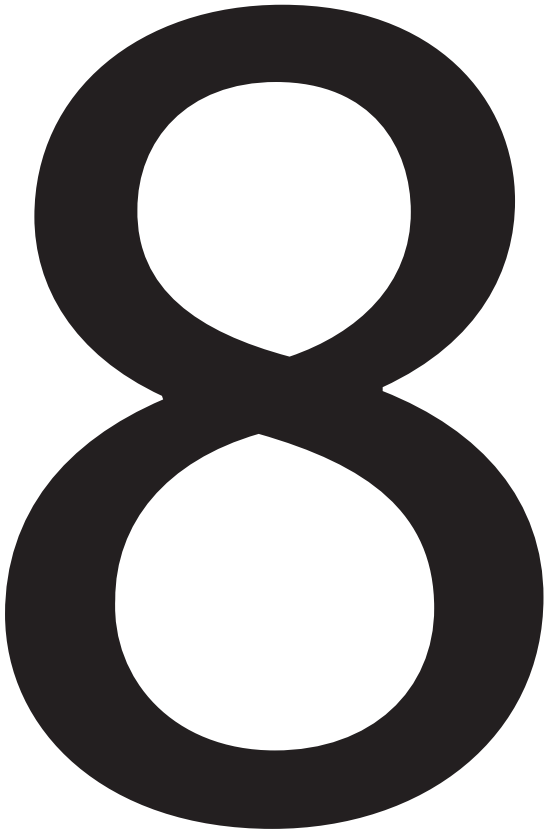
If we take the theoretical approach; that the Hebrews allowed for the limited (productive) natural landscape to dictate village clustering, then that may be a driv-

ing component of our contemporary explorations. Yet, since we are designing our site in one of the most fertile regions of the world and willing to develop water and forest resources as part of our development, the idea of developing only on existing natural productive features is also irrelevant (although I will demonstrate how to locate Bet-ave/village culture on our site if we were to limit large scale engineering or forest development) Therefore, as a regional planning module to emphasize the decentralized nature of the Hebrew social order, I am choosing to limit the size of a cluster to three Bet-aves per village. Three Bet-aves would be in the spirit of decentralization yet a grouping that would permit protective needs to be fulfilled (or at least theoretically patronized as the question: what did the Hebrews believe was a sufficient protective association - is unanswered)

Another variable is being brought into this village sizing procedure and that is source, "Anatomy of a Village"; it indicates that 300 people is about the size of traditional English village and anything over that size would be considered a small town or city. For the sake of creating arrangement that would prohibit the temptation in inter-Bet-ave organization and economics, the minimum then is this three Bet-ave sized village.

From this lack of clarity we shall assume three Bet-aves (and build up from there where the site demands). Where these villages are located and sited, and the potential for these villages to morph in scale and size – or be further clustered - will be determined by our earlier assumption that the environment and the people's dependence on resource availability would ultimately be the trumping determinate. (For an exact calculation of such permutations on our site see Figure 5.55)

SELF-SUFFICIENCY LITERATURE REVIEW



8 LITERATURE REVIEW: FINDING THE NUMBERS

This literature review is being conducted in the service of calculating numbers for the size requirements of productive infrastructure in a contemporary self-sufficient farmstead. The aim is to base line the units at the least common denominator of economic existence: a five person nuclear family. Once this module is established we will develop a module using the 5 person unit as a multiplier for the 100 person Bet-ave.

When one sets out to live the "self-sufficient" life (a term that will be explored in greater depth in this literature review) there are a two major requirements, the capital/spatial requirements required for production at a defined level of human need (consumption), and a method to measure the systems performance through the production/consumption ratio.

Not necessarily geared towards self-sufficiency, Pliny Fisk's eco-balance/regenerative design methodology offers insight and guidance to the process of developing theories to measure building and site performance. (In his case environmental sustainability performance).

In a series of articles: ***Developing a Design Methodology for Sustainable Systems, Eco-Dynamic Architecture and Planning, and Original Concept: Laredo Demonstration Farm***, Pliny Fisk determines that in order to measure if a site design achieves "eco-balance", there have to be boundaries drawn at some point to classify,

the unit. By means of the boundary, the unit is established, and the performance of that unit can be measured. Boundaries can be drawn at various scales i.e. Home, home cluster, neighborhood, city, county, state, and region/biome. The larger you go in scale, the more complex analysis becomes, and the more you permit certain entities to over balance others. For example, on the home scale (if the boundary was drawn around the home) the responsibility of performance rests solely on the house itself, i.e. Grey water reuse. Whereas on the neighborhood scale, if all water were channeled into a wetland the water could be purified there, to achieve over all neighborhood scale eco balance. [*But how much greater positive impact if a wet land did not have to be created because water was being treated at the house level*]. In this example of scale, the house would be a poor performer of eco-balance but the boundary around the entire neighborhood would be in balance via the ecosystem service of a wetland.

But water management is not the only performance ratios in Fisk's eco-balance models which are aimed to measure total environmental impact of design intervention. The following ratios are the most pronounced in his system: air, water, food, energy, and material. Fisk's model was elaborated, expressed and evolved in John Motloch's "***Eco-Balance Design',*** *a design framework*, discussed in his book, ***Introduction to Landscape Design.***

What I am proposing is that, while each of these ratios are employed to discover if a site in is in eco-balance, would not the same principals of boundaries and performance measurement through ratios be applied to self-sufficiency home economics (production/consumption ratio)? I.e., could site capacity and ability to sustain itself

economically speaking be measured in the same way that a site could be measured if it can sustain itself environmentally? And for the environmentally conscious homesteader, what a comprehensive combination of having both Eco-Balance integrated system approach with the quest for a near whole production/consumption ratio.

Admittedly, the lines begin to blur between environmental sustainability and economic sustainability in the first place. In fact, in some ways economic sustainability can be read in the fine print of Fisk/Motloch's, energy ratio, and food ratios. But in this literature Fisk's dealing with food is different than how a homesteader would look at food. In Fisk's model, food performance analysis ratios measures if the ratio between how much food is being imported on site, and therefore could be treated, as waste, on site. This automatically forces the boundary of total eco-balance onto the producers of food that sell it to users in order for the large scale (community) boundary to be in eco-balance. This not-so-subtle difference is simplified by self-sufficient homesteader where food economy stops at the edge of the property line and where the space must be provided for all food to be grown *and* waste treated on site.

Therefore the question of boundary is solved for the homesteader (as it is the lowest common denominator). The self-imposed limits of a homesteader, sets the boundary for both econo-balance and eco-balance and positions itself to be one of the most simplest methods of performance analysis. I will echo Fisk's maxim, "decisions should be taken at the lowest possible denominator within the hierarchy of that particular decision" And the unit of the self-sufficient homestead is possibly the most basic possible unit of all economics and where analyzing the spatial dimension of the

farmstead becomes the boundary of measurements.

Base-Lining Land: Spatial Planning for Food

In the book, "The Self-Sufficient Life and How to Live It," John Seymour lays out the foundations on the modern homesteading movement. He outlines a realistic methodology from which he has tested and mastered at his various farms which he has developed most recently at The John Seymour School for Self-Sufficiency in Ireland. Seymour has been a leader in the movement towards self-reliance and towards household economies.

One the undeniable basics of self-reliance is food production and that is one of the most significant spatial factors in scaling and design a homestead site. (In this case animals are being considered food, so the special requirements of feeding them are also included) The spatial requirements of the homesteader becomes the spatial requirements for the Econ/Eco-Balance design[the other major contributor to base lining sizes of farmsteads is fuel. To be addressed later]

The book was produced with the intention of serving as a guide to the self-sufficient life by outlining various process and techniques related to the farm, and household functions (and household services in general).

Seymour is of the opinion that a family of five's food needs could be provided by a 5 acre parcel of land in a healthy fashion. (Except exotics coffee/tea) As a result, the 5 acre lot is the module for my nuclear housing and design's spatial requirements. He also goes to explain how the five acre site should be divided up: one are for the

house and buildings, orchard, and kitchen garden and last 4 acres divided in 8 half acre plots that would be rotated between grass (three plots), wheat, root vegetables, potatoes, legumes, barley. This is the basic skeleton for the food systems of the site.

In Ken Kern's book, ***The Owner Built Homestead,*** he presents the five acre homestead as an ideal. In **The New Pioneer's Handbook**, the author, demonstrates the need of 2 acres of food production on rotation, which if livestock and home was not included, would be comparable to Seymour's. **Five Acres and Independence,** a book by Maurice G. Kains serves as a handbook of small farm management. While the books covers numerous aspects about farm design and management, at its core is the 5 acre farmstead which is indicated by its title.

The Ecological Footprint and what it means for the homesteader and spatial requirements

A secondary driving overlay for design thinking and theory is the ecological footprint calculator which addresses carrying capacity of a site. The Eco-Foot printing concept and methodology was made popular by the book, Our Ecological Footprint: Reducing Human Impact on the Earth, by Mathis Wackernagel and William Rees. While this is similar to Fisk's ratios to measure the balance of a particular boundary (large or small) in terms of production/and consumption it simply describes the need for balance and offers statistics on current ratios in various population case studies rather than offering homestead design guidance. The book, aside from promoting growth and development of human civilization in balanced means, does not frame it explicitly in designers terms, yet can become equally as valuable. The researchers in the ecologi-

cal footprint found that the average North American consumer needs 10 acres at current consumption patterns.

Again, this Typical North American calculation is broken down in to the following sub-units

food – 3.3 acres

housing (operation and maintenance) – 2 acres

transportation – (2 acres)

consumer goods – (2 acres)

services - (0.7 acre)

At first glance this might seem like a huge jump, almost two times as much as Seymour (and other authors) proposes.. One consistency between these two schools of thought is the food (which is the primary driver for Seymour) and housing. As you can see, that even at current levels, Seymour, a western European with some what comparable statistics, is acknowledging that 5 acres of land would provide a person the resource to produce self-sufficiency. And that is at current US consumption levels! Imagine the homestead eating marginally less food and you may see a slight decrease of land area, (imagine if you cut out animals/meat entirely) but undoubtedly there are huge gains to be made in the household dimension of this analysis. With passive system technology, the carbon footprint of a house can drastically be diminished as well as utility systems such a grey water/purification, solar heating, photo voltaic cells, and wind. (Which aren't factors in Seymour's model) (One can image the scale of the house hold being reduced drastically more as new technologies emerge over time).

As for the rest of the Ecological Footprint categories, consumer goods could

decrease with more production at home, and transportation could decrease with less need to go off site for resources (and shipping costs), and services could decrease with less need for outside influence to the site as well. The above musings are somewhat stretching it. It's a big stretch to take the 5 remaining acres into and squeeze it onto 1 but no one denies North America consumes way too much, and simplicity may need to be presented as a function of self-sustenance anyway if not a land/social ethic. Perhaps it should be noted that this reduction in consumption would be one price to pay in gaining the capital to produce for absolute needs only and not for production for over consumption or frivolous "wants".

The second commentary of the eco footprints consumer goods and services breakdown is that this occurs on the market side of the spectrum and may be why this may not even be included in Seymour's analysis. In an ideal world, each business sector entity would be responsible for their own eco-footprint in terms of what it would take to produce the marketed goods at their real environmental price. In that case, any consumed good from off site and moved onto Seymour's five acre plot would simply need to be treated on site, (similar to Fisk's food ratio)

Furthermore, another approach to this, is to say, consumer good, transportation, and services, are all in some sense luxuries provided by others and therefore would fall off entirely or be reduced in a drastic sense by radical self-sufficiency advocates.

If the goal of the self-sufficient life is to have ownership of the means of producing necessary goods on principle only, it wouldn't matter if total consumption

was higher than the econo-balance, if the sense of success and boundaries of econo-balance, in the mind of the user, was based on absolute needs and the infrastructure to provide those needs only. In that case, a person could rightfully say there were "self-sufficient", although they were consuming luxuries they were unable to produce themselves with their land area or skills.

Land Spatial Requirements for Energy

In the New Pioneer's Handbook, the author provides another key piece in the spatial requirements phase. He makes the point if wood is used as the primary source of fuel for every mechanical process (car, tractor, house, etc.)then one would need 5.5 aces of wood on an eight year rotation. You can see how this begins to become a non factor is the homestead oriented toward wind/solar power or a homestead using Seymour's 1.4 acres of grass/barley each year for bio-digestion/bio-fuels. But it is important to note the most basic, cheap, and easy source of fuel is wood, and how space requirements would drastically change if wood fuel was the only allowed source.

Land requirements for Water

According to *The Book* ***Back to the Basics***, one human consume 30 to 70 gallons per day and 500 square foot kitchen gardens need about 35 gallons a day. This must be a factor in site design as water is another large spatial factor. It becomes less of a spatial factor the more vertical elements are used to sequester water.

Proposed Self-Production Flow Chart

As mentioned throughout this entire literature review, the *projected point* is

total self sufficiency. Below is a spectrum of organization to self sufficiency a concept derived from the ***Self-Sufficient Life and How to Live It.*** The Red dot may represent, as mentioned above, a point where a person may have the infrastructure for basic needs production and is producing basic life necessities, but is not totally self-reliant as they are still consuming goods from markets. You can imagine the red dot moving to the right as users cut back on over consumption, luxuries, etc.

Figure 8.1 Degree of Self-Reliance

And that is to say there can't be total self-reliance. But perhaps the individual would be willing to phase it in. They could take their 5 acre farm and begin to develop it according to percentages of their total current consumption.

If the Ecological Footprint says 10 acres of land is required for current North American consumption patterns then lets imagine scenarios where a average north American may have to reconcile to their 5 acres.

Default

Food – 3.3 acres (33%)

housing (operation and maintenance) – 2 acres (20%)

transportation – (2 acres) (20%)

consumer goods – (2 acres) (20%)

services - (0.7 acre) 7%

Alternative 1 on 5 (**be half self-sufficient**)

food – 1.65 acres (33%)

housing (operation and maintenance) – 1 acres (20%)

transportation – (1 acres) (20%)

consumer goods – (1 acres) (20%)

services - (0.35 acre) 7%

Alternative 2 on 5 **(be fully self-sufficient on land and house)**

food – 3.3 acres (33%)

housing (operation and maintenance) – 0 acres (0%)

transportation – (0 acres) (0%)

consumer goods – (0 acres) (0%)

services - (0 acre) 0%

Alternative 3 on 5 (**compromise lifestyle and be full-self-sufficient**)

food – 3 acres (60%)

housing (operation and maintenance) – 1 acres (20%)

transportation – (.5 acres) (10%)

consumer goods – (.5 acres) (10%)

services - (.00 acre) 7%

In any of these cases, and regardless of the person's success at arriving at maximum econ-balance on site, what they will have is the land, capital, and opportunity, to be self-reliant in principle. Perhaps the five acres will be organized to self-sufficiency at the result of some change in urgency or necessity at the result of a major shift in culture (oil wars, etc.) In this case, every Bet-ave would be poised towards total self-

reliance.

As a final remark, there is the question, if a person should want to consume more than they need, and produce more to provide for that, then why doesn't that person just get 10 acres in the first place and put it under production. That is valid, but it's also valid to simply ask the question at what point does environmental and social responsibility come into play when choosing consumption patterns on a planet with increasing populations and diminishing natural capital.

In any case, when designing a self-sufficient homestead for the purpose of mimicking Pre-monarchic social values, we must ignore surplus and luxuries when these get in the way of full fledged and authentic self-sufficiency. This seems to trump the conversation about expanding the footprint to meet current north American over consumption patterns (despite all of our rhetoric advocating the contemporary Bet-ave response to current cultural contexts). Therefore the footprint that is used in this process is sized according to self-sufficiency as understood in relationship to basic needs and will not be compromised to American overconsumption.

THE FRAMEWORK

9

9 THE NUMBERS FRAMEWORK

Implementing Literature Review of Homesteading resources:

The literature existing on the homesteading movement, normatively, uses a five person nuclear family as the unit of analysis. There are numerous resources that seem to have a consensus of the land footprint requirements of the nuclear homestead at about 5 acres. The source most prominently referenced in this investigation is john Seymour's the self-sufficient life and how to live it.

As mentioned, John Seymour lives and works on a self-sufficient farm which serves as a education resource for those wishing to learn about the self-sufficient life. He has developed his theory through years of experience both with his theoretical systems and on site implementation at his School for Self-sufficiency.

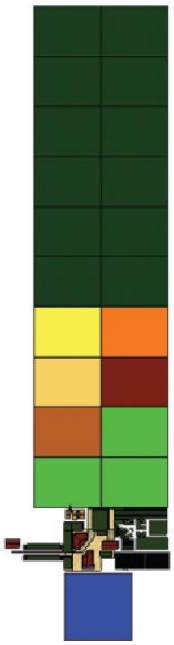


Figure 9.1 Singe Family Footprint

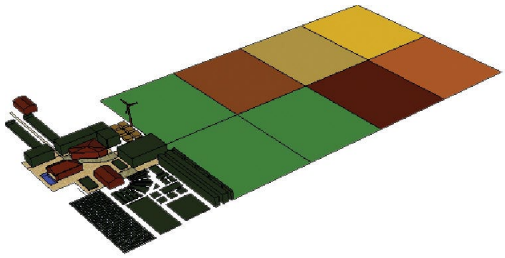


Figure 9.2 Singe Family Footprint (2)

HOUSE-HOLD	TOTAL ACRES	HOME & GARDEN	GREEN SPACE	WATER	GRASS-LAND	ROW CROPS	FOREST	POPULA-TION
	12	0.19	0.15	0.66	1.5	2.5	7	5

Figure 9.3 Single Family Footprint Chart

Food

In his model there are five acres of land dedicated to food production. One acre of this amount is dedicated towards the core garden, or kitchen garden [permaculture], which includes the homestead and orchards. The remaining four acres are rotated between 1.5 acres of grass and 2.5 acres of wheat, root vegetables, potatoes, barley, and legumes.

Seymour's research does not include exact water measurements, detailed energy requirements (see section three: forest) , green space requirements (anatomy of a village; which will be incorporated at large village scale clustering and individual Bet-ave compounds) or building materials. These factors have been represented in the hybrid-model (previous page) and explored and examined in the following sections.

Water

The water flow chart (see appendix) traces the ratio between water availability through rainfall, and the water demands of a typical Midwestern family. There are two water catchment devices under consideration a) the total roof area for the house and outbuildings on each individual family unit, as well as b) the aperture of the pond. This system accommodates water usage for three user groups. a) the family b) the core kitchen garden and c) animals (the amount of animals are determined by the grazing area laid out by Seymour). Seymour also lays out the size of the kitchen garden (one acre).

The variable that changes this system is the pond aperture and this is sized to

collect the water that the roofs cannot collect. This system does not rely on the aquifer as a water source as it is seen as primarily a backup. This pond also is not designed in such a way to collect sheet-run-off by surrounding land.

By keeping the water source rooted in ponds and services by direct rainfall, it allows the pond to be both an amenity, a transportation system, as well as additional food and energy production. The pond is sized for the animals and 100% irrigation of the core garden and has the potential to generate 1200 lbs of fish per year.

The purpose of the pond is to collect rainwater for animals and irrigation for the core garden. The pond size is determined by how much additional watering is needed for a four inches a month watering schedule after rainfall, summer greywater, and excess roof runoff. The depth of the pond is 14 feet and is ideal for fish production. The below graphic shows how pond size is related to irrigation potential.

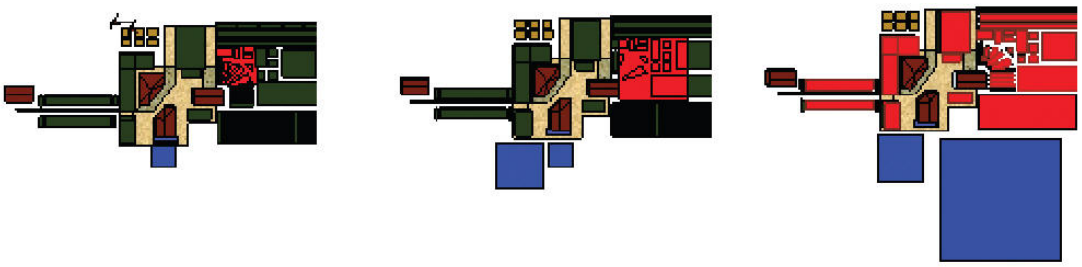


Figure 9.4 Water Footprint

The pond size is determined by amount of core garden acre one wants supplementary watered (the largest water need/variable) The above graphic shows the relationship to water capture (blue) and core garden watered (red). Green represents entire core garden.

Energy: rationale for forest sizing

The energy demands of a typical Midwestern family are broken down into two categories. Heat and all other usage (electricity, transportation, machinery, etc.) this is part due to the fact that heating demands would have been the primary energy demands of the Hebrews as well as arguably the most essential for immediate survival.

There is a problematic relationship as well between energy generation sources and their scale; The primary low tech energy source in our proposed East Central Indiana site is the forest as fuel production. Considering the demands of both heat and all other energy demands, the footprint of the forest would be exceptionally large to provide energy for both heat, and all other usage. The diagram below shows the footprint relationships of three scenarios. a) all energy demands generated from the forest b)

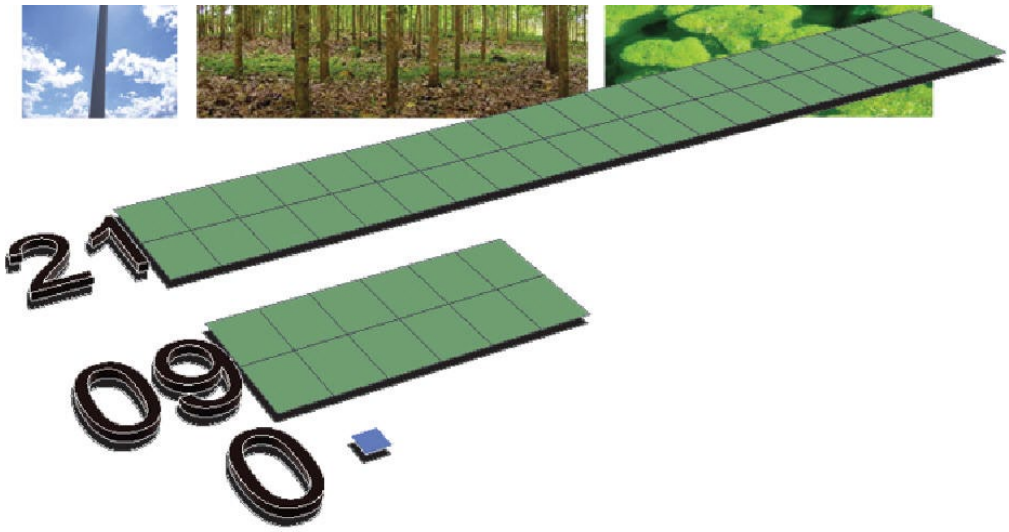


Figure 9.5 Energy Sources

heat only generated from the forest and c) a forward thinking alternative energy generating technology (algae wheels) which would be fueled by the greywater system.

Although it would be possible to have 21 acres of forest to generate the additional energy requirements (other than heat) in this project we are choosing to use alternative sources of energy, such as solar and wind power as substitutes.

These technologies were not available to the Hebrews, but at the same time, neither was the demand. Permitting these technologies coincides with the design intention to design a village that responds to the needs of a typical Midwestern family.

Also, due to the placement of these technologies on current existing infrastructure (solar on roofs) or integrated with other land use (turbines in ponds or agricultural areas) the presence of these technologies do not affect the spatial demands that would coincide with the Hebrews spatial needs from a food, water, heat requirements (consuming similar amount of food). These supplemental energy sources could also be perceived as "optional" in the minds of those wanting pure integrity to the Pre-Monarchic community (the "pure integrity" at this point, is a "fluffy" notion.) or ignored by those interested at the spatial requirements for a site developed with historical significance only. Charts, located in the appendix, outline heat and electricity consumption of a Midwestern family including some theoretical assumption of additional technology (cars tractors, etc.) using low end figures. Also included are indications of the three sources of energy production, algae, photo voltaic, and wind generation.

Waste

As mentioned, the aleage technology is forward thinking and sized for the grey water system, which would have the potential to ultimately tie all water usage and waste and energy into an integrated system. The below diagram illustrates these relationships.

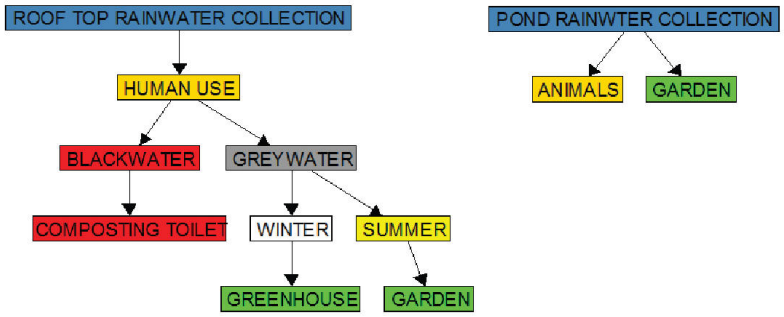


Figure 9.6 Water Usage Flows

Building Materials

As shown in the axonometric, the primary building materials are straw bales and wood which are both sustainably harvested on site. Secondary building materials are bamboo (for interior finishes grown in greywater processing) rammed earth (for additional walls and foundations) and soil cement (for exterior and interior paving.

Figure 9.7 Building Materials

Conclusions of framework

Using the Nuclear Family household footprint, outlined by Seymour, and additional sources, one can work towards calculating a footprint for the Bet-ave as well as the three Bet-ave sized village. (decided upon for planning purposes) This is what is meant when referring to the nuclear family calculations as a multiplier. The footprints can be depicted in the following diagrammatic models

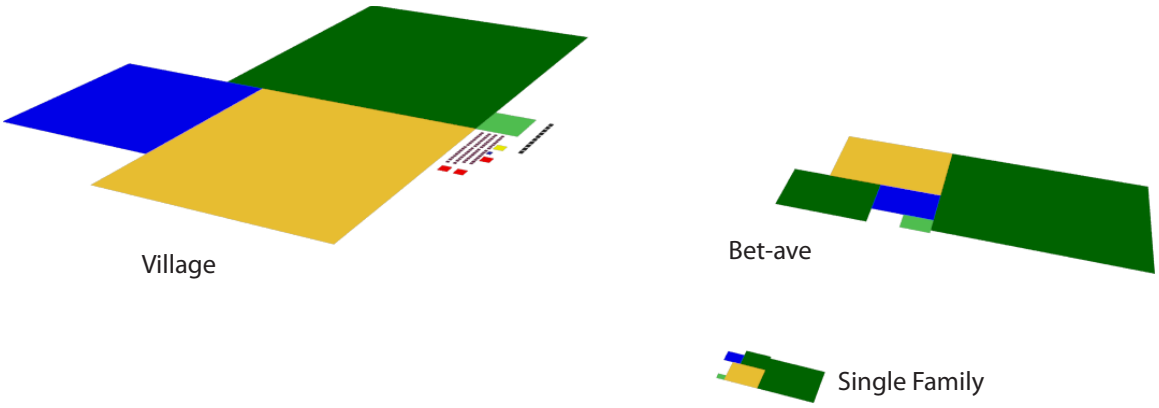


Figure 9.8 Comparative Footprints

The following steps have been completed:

1. Intellectual exploration of ancient Hebrew society.

2. Identifying a lack of specific information on the sizing of Bet-ave communities.

3. Using contemporary homesteading information to fill the gap and give contemporary estimates for foot printing based on current consumption levels (permitting use of electricity and automatic transit through alternative energy generators that don't affect footprint)

4. Creating a model and series of calculations – below – to use as a planning tool when designing community development.

THE FRAMEWORK

HOUSEHOLD	UNITS	TOTAL ACRES	HOME & GARDEN	GREEN SPACE	WATER	GRASS LAND	ROW CROPS	FOREST	POPULA-TION
SINGLE UNIT	1	12	0.19	0.15	0.66	1.5	2.5	7	5
BET-AVE	20	240	3.8	3	13.2	30	50	140	100
VILLAGE A	40	480	7.6	6	26.4	60	100	280	200
VILLAGE B	60	720	11.4	9	39.6	90	150	420	300
VILLAGE C	80	960	15.2	12	52.8	120	200	560	400

Figure 9.9 Framework Chart

Conditionally, the question: of, "What is the spatial footprint of a Bet-ave" has been solved. The only condition is for the reader to permit the various assumptions that need to be made in order to reach such conclusions.

THE DESIGN

VILLAGE PLANNING

10

Site Location in Relationship to World Biome

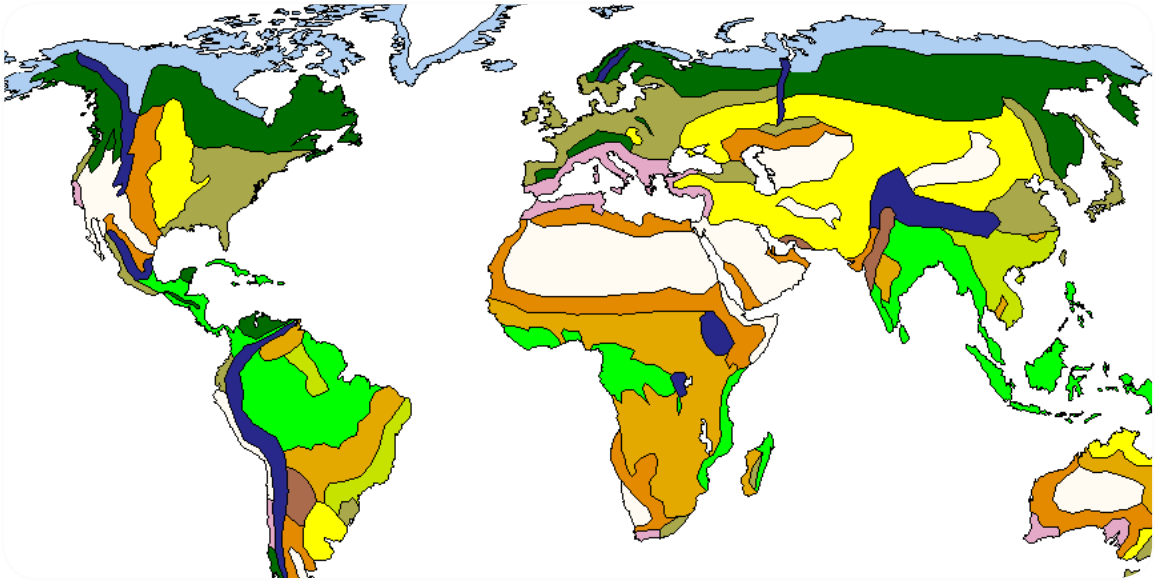


Figure 10.1 Biome Map of Word, Land Design Institute

Temperate forest

Temperate Deciduous Forest Biome

The site that will be analyzed is located in the temperate deciduous forest biome. The natural goods required for self-sufficiency: energy, food, and water will be dependant on the variables in this region and will be considered throughout the design process. The conclusions/ application of this project can apply anywhere in the world where the deciduous forest biome is dominant. John Seymour's farmstead, which served as a precedent for the framework, is located in Ireland and the "Anatomy of a Village" precedent focuses in England, both of which are located in the Deciduous Forest Biome.

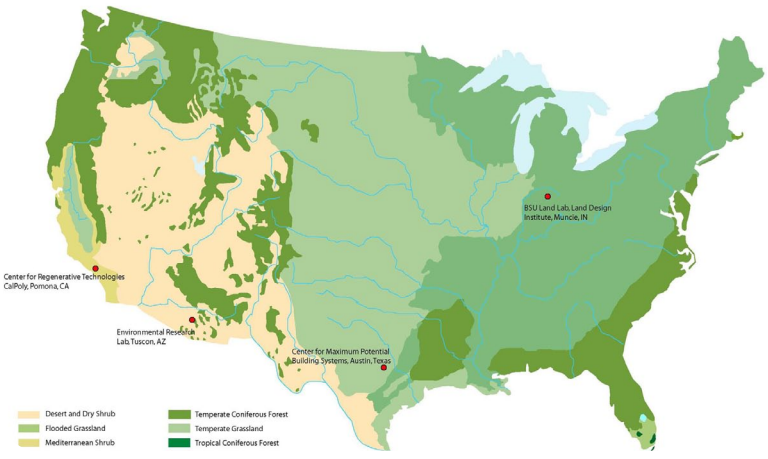


Figure 10.2 Biome Map of Word, Land Design Institute

The Temperate Deciduous Biome in the United States is one of the largest biomes.

This project has potential application to sites in the eastern part of the country.

Temperate forest

Site Location in Relationship to Indiana

Site located on the cusp of major Indiana Eco-Regions

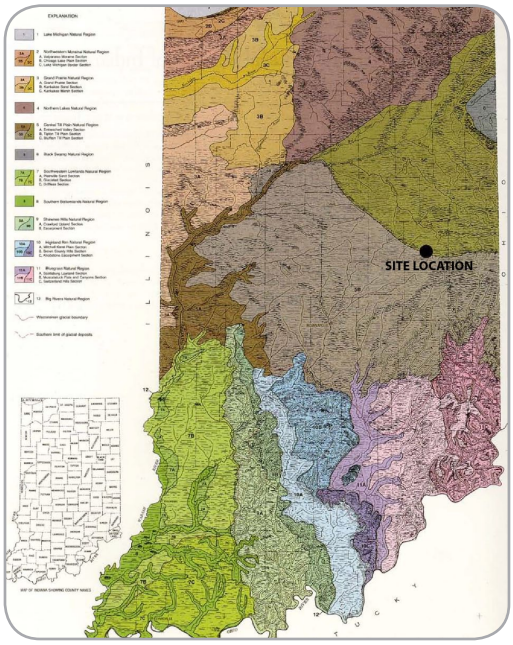


Figure 10.3 Indiana map, LDI

The natural landscape of Indiana has been augmented/shaped by glacial influences. The most recent glacial period developed the vast and fertile central till plains of Indiana where this project is sited. The natural abundance of fertile soil, forest systems, wetlands, and low topography makes widespread development of the Bet-ave possible and desirable.

Site Location in Relationship to Delaware Co.

Figure 10.4 Indiana map, Friends of WRWP

The White River flows in two forks across most of Central and Southern Indiana, creating the largest watershed contained entirely within the state, draining all or part of nearly half the counties. (source)

Site Location in Relationship to Delaware Co.

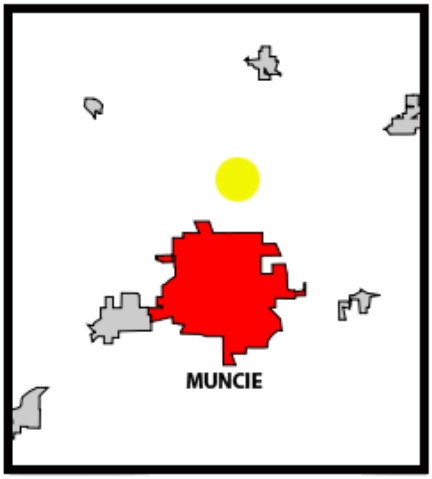


Figure 10.5 Delaware Co., Wikipedia

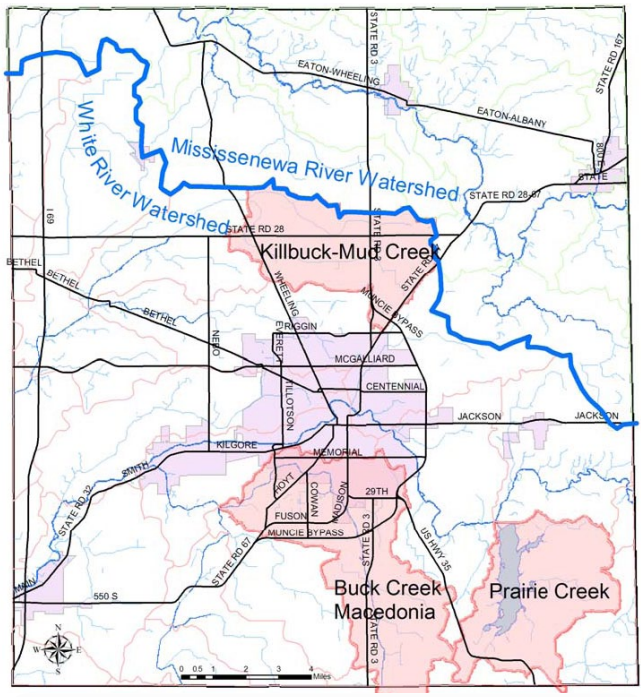


Figure 10.6 Delaware Co., WRWP

Delaware County is located in East Central Indiana. The county is lo-cated in the is the Northeast Corner of the White River Watershed. The Killbuck-Mud Creek subwatershed is located in the norther half of the county. The Counties primary river, The White River, serves as the spine for the Counties major city, Muncie.

Site Location in Relationship to Subwatershed

The planning portion of the project is based on the Killbuck/Mud Creek Subwatershed

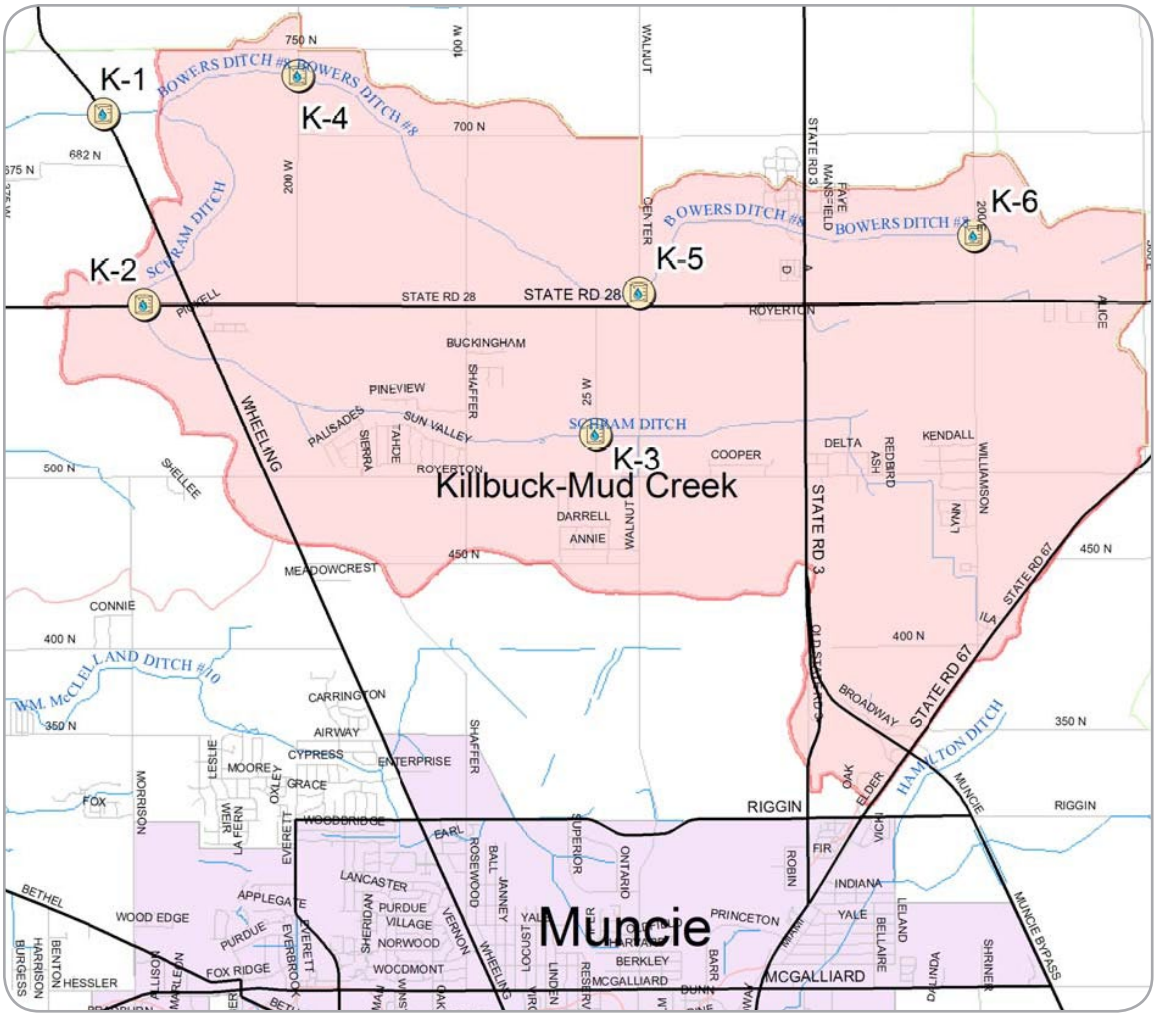


Figure 10.7 Killbuck-Mud Creek Subwatershed, White River Watershed Project

The Killbuck-Mud Creek Subwatershed is within the White River Watershed. The boundaries of the subwatershed are located in Delaware County, Indiana. (Almost 100 percent of the watershed is located in Hamilton Township.) It is is located in the Bluffton Till Plain section of the Central Till Plain. Deleware County's major city, Muncie, is located five miles south of the subwatershed. This area is used as the boundary for site analysis and is the location of study throughout the project. The subwatershed is dominated by agriculture and is defined by a abandoned railroad track on its west side. There are 67,000 residents in Muncie Indiana and 118,770 in Delaware co.

Site Summary: Killbuck/Mud Creek Subwatershed

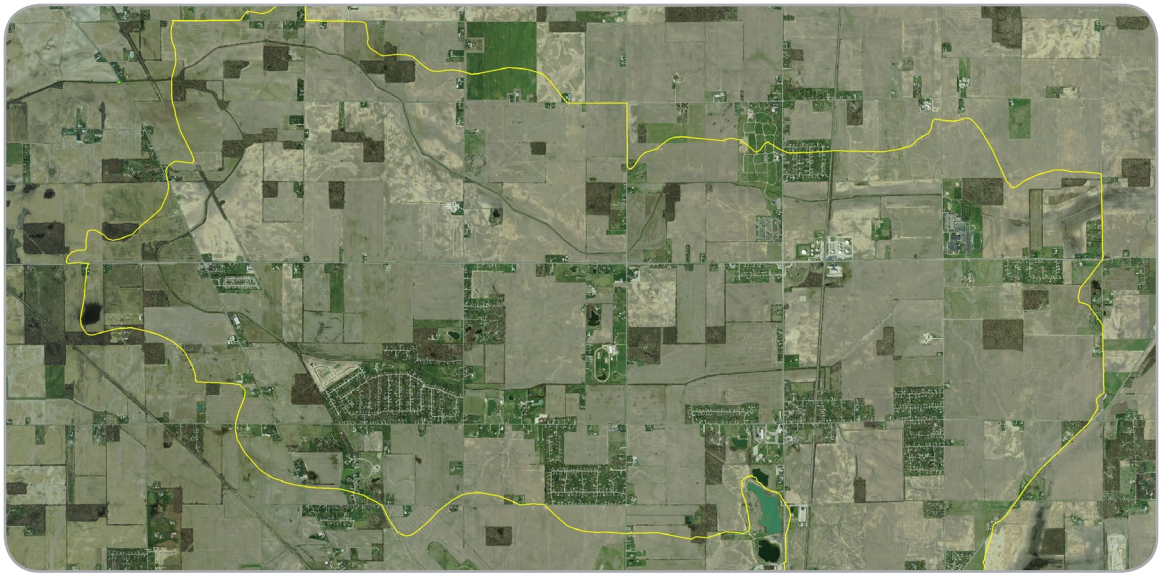


Figure 10.8 Killbuck-Mud Creek Subwatershed, White River Watershed Project

According to the 1849 Delaware County Retrospect, "The face of the county is mostly level or gently undulating, even the rivers and creeks not having any considerable bluffs or hills in their vicinity. In the southwest, southeast, and northwest parts of the county and near the center, there are prairies mostly small and not exceeding one-twelfth of the county. They are usually called wet prairies . . . The principal growth of timber is oak, hickory, poplar, beech, walnut, sugar, linn, etc., with undergrowth of hazel, dogwood, spice, and prickly ash; but the oak land is more extensive than the beech.". (http://www.countyhistory.com/delaware/start.html)

Delaware County was organized in 1826, being named after the largest division of the Delaware Native American tribe that made its home here. That tribe was the Delaware Indians, an Eastern tribe that settled in east central Indiana during the 1770's. The Delaware Indians established several towns along the White River, among these Muncietown, near present day Muncie. (http://www.rootsweb.com/~indelawa/county.htm)

The Killbuck/Mud Creek subwatershed is located north of Muncie, It surrounds a smaller town, Royerton. Residents of the watershed attend Delaware Community School Corporation. Royerton, like most of the county's small towns, was laid out along the railroad line. Other major towns in the county initially included Desoto, Cowan, and Oakville, and their site locations are also in conjunction with old railroads.

Delaware County's population almost doubled to 23,000 between the years 1860-1880. During these years, Muncie began to evolve into an industrial city. By 1880, Muncie had forty factories, manufacturing products ranging from washing machines to roller skates. During the next few years, more than a dozen new industries opened. In 1888, five brothers from Buffalo, New York moved to Muncie after their glass factory had burned. Ball Brothers became one of the largest employers in Muncie and their Ball jars and other glass products were shipped throughout the country. During the 1890's, additional businesses located in Muncie including Midland Steel, Indiana Iron Works, and the Muncie Wheel Company.

By 1900 the Union Traction Company had opened an interurban line between Muncie and Anderson. The interurban passed through many of the smaller towns and cities. The opportunity to easily and inexpensively travel to a larger city to make purchases and conduct business decreased the economic importance of smaller towns. This became more evident when the interurban extended its service to Indianapolis early in the century.

In 1917, the Ball Brothers bought what had previously been the Eastern Indiana Normal University and offered the property to the State. The school opened as a teachers college in 1918. The college is now known as Ball State University." (City of Muncie,

http://65.174.85.151/default.asp)

Following World War II, Muncie boomed with the industrial shift from wartime support operations to automobiles and became a suburb of major automotive centers such as Detroit. The automobile and its infrastructure augmented the county landscape creating opportunities for residential sub-divisions to develop throughout the county. With the advent of automobile, commerce become oriented towards commercial strips and malls, Muncie as a city lost its locus as a community center and with the rise of international globalization, Muncie lost a majority of its manufacturing base and unemployment levels have been steadily on the rise. In order for Muncie to survive in an international economy it must find new means of production and many of the current leaders are looking to service oriented industries to fill the gap.

Prior to the industrial revolution, the fundamental lifestyle of the typical resident of Deleware County was farming. People left farms to work in industry. As the industry leaves, instead of looking for new industry to return it may be that residents should look to agriculture and other local economies as a potential production and job source. (This proposal is just one idea and is speculative.)

Natural History

The Killbuck/Mud Creek Subwatershed lies in the Clayey High Lime Till Plain Ecoregion. Delaware County is in "Ecoregion 55, Eastern Corn Belt Plains, which is characterized primarily by rolling till plain with local end moraines. (Ecoregions of Indiana, USEPA (http://www.epa.gov/wed/pages/ecoregions/ohin_eco.htm)

The entire subwatershed "drains 10,039 acres (15.7 square miles) and has two

main waterways within in its boundaries (Mud Creek to the North and Killbuck Creek to the South). Mud Creek combines with Killbuck Creek at the northwestern corner of the watershed to form Killbuck Creek from that point on downstream." (White River Watershed Project)

"Both Killbuck and Mud Creeks are naturally occurring waterways. However, their original channels have been highly modified by human alterations undertaken in an attempt to increase drainage of the surrounding agricultural fields. These modifications have altered the channel cross section to a degree that it has become unstable and has initiated a cycle of erosion and dredging that will continue until the channels can be engineered to mimic the natural flow of water dictated by the topography, soil types and gradient of the area.

In addition to channel alterations, there has been extensive underground tiling and above ground ditching within the subwatershed which reduces the amount of water that infiltrates into groundwater aquifer storage and increases the flow found in both channels. Through visual observation, many of the above ground drainage ditches also have structural problems that contribute to the siltation problems found throughout this subwatershed. Drinking water in this subwatershed is a combination of private wells and municipal water (supplied by the City of Muncie). All municipal drinking water comes from the White River. The aquifer for this subwatershed is the Silurian-Devonian Aquifer. There is a total of 102.47 acres of wetlands in the Killbuck/Mud Creek Subwatershed (USFWS National Wetland Inventory [NWI], http://wetlands.fws.gov/), representing 1.02 percent of the total subwatershed acreage. "(White River Watershed Project)

Current Land Usage

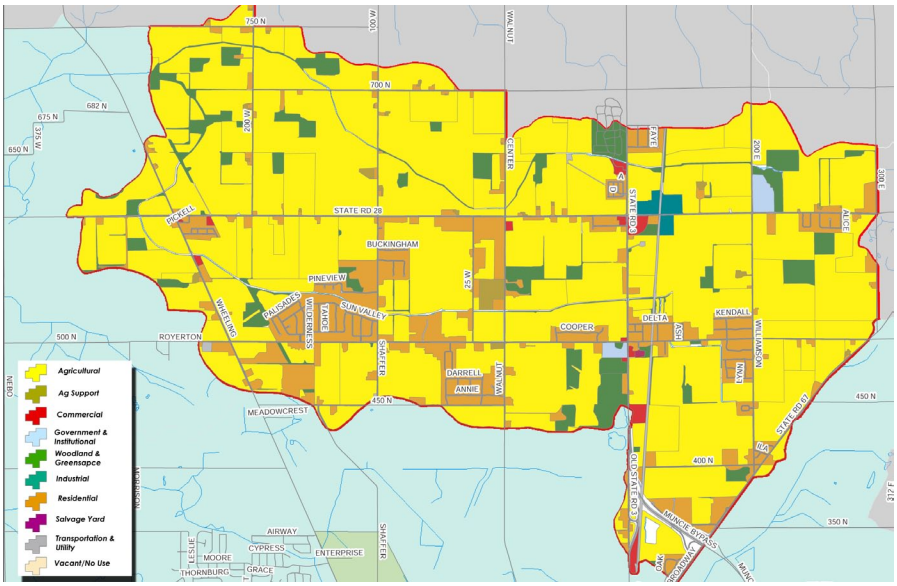


Figure 10.9 Killbuck-Mud Creek Subwatershed, White River Watershed Project

Prior to European settlement, the subwatershed was generally covered with beech and elm-ash in the wet-forest area. Since European habitation, the area has predominantly transformed into conventional agriculture (corn and soybeans). "No exceptional fish communities exist in the turbid, low gradient streams of Killbuck or Mud Creek". The land has been altered to accommodate machine-based intensive agriculture which in turn has led to soil erosion, stream augmentation, and polluted air and streams through fossil fuel usage.

Current land use in this subwatershed:

Agricultural 73.35%
Transportation & Utilities 3.55%
Residential 14.13%
Industrial .42%
Greenspace 6.98%
Government & Institutional .39%
Commercial .54%
Agricultural Support .64%

How many Villages? (Three Bet-aves/village)

Figure 10.10 Parcels: Major Roadways

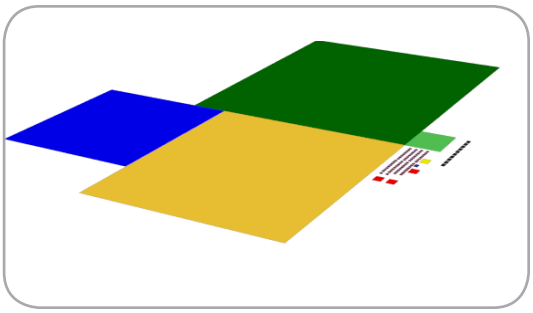


Figure 10.11 Spatial footprint of Bet-ave

Analyzing the subwatershed through land-use module.

In order to determine the number of Bet-aves the site could spatially sustain, the subwatershed was broken into sub units based upon the existing grid road network that organizes the county. Each of these individual pieces was analyzed based on their total square footage, and how much of that square footage was either forest, brownfield, or standing water. Throughout this project the grid network was preserved, therefore placement of be-ave village will never cross road boundaries.

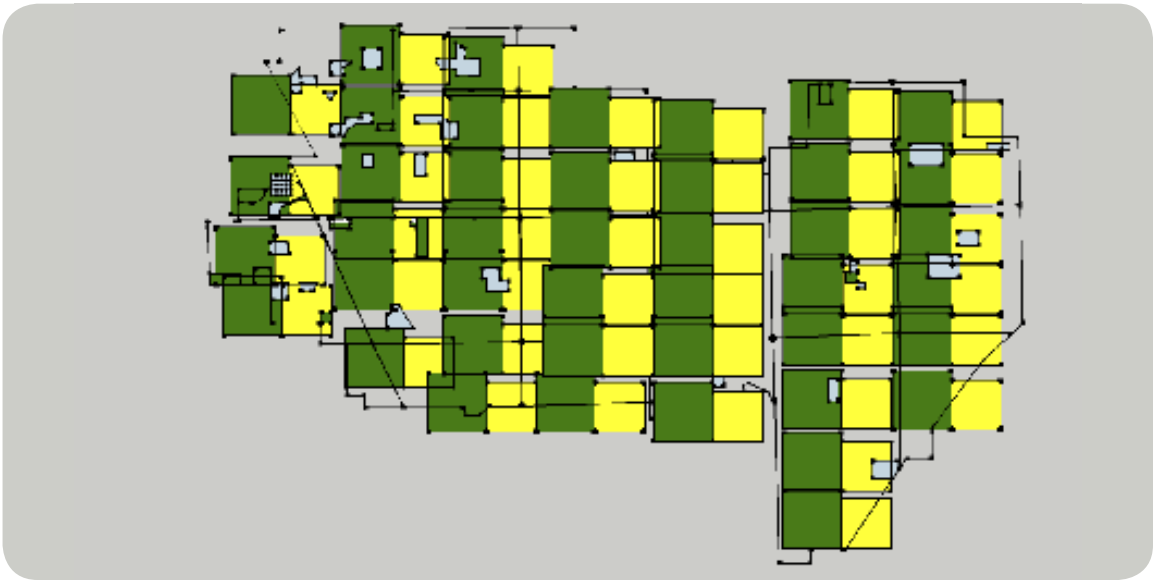


Figure 10.12 Schematic Placement of Bet-ave based on spatial footprint

Preliminary Conclusions

The primary question based on this study was: How many "Bet-aves" could be placed on site by *only* accounting for square footage. This was for the purpose of determining the sites maximum human carrying capacity based upon the nuclear-family-module-system outlined in chapter two.

Existing Forest in Subwatershed

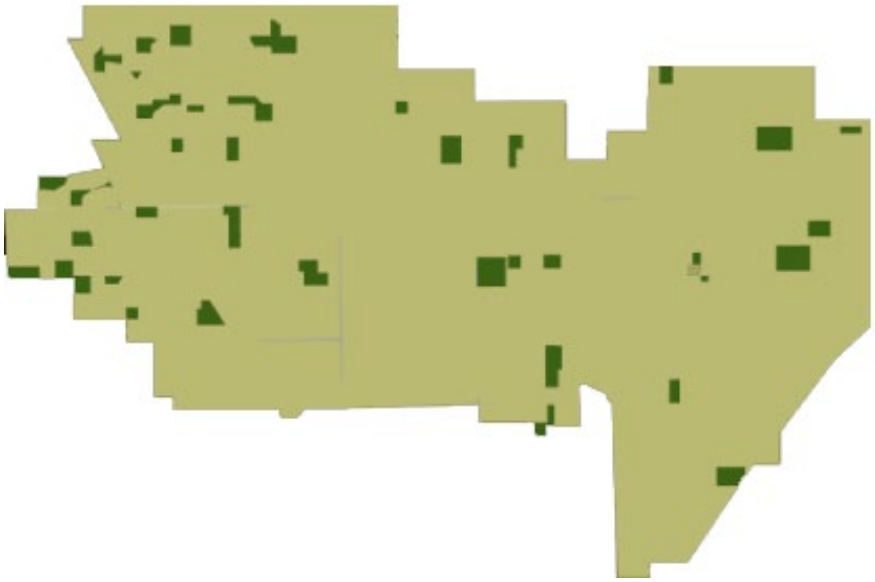


Figure 10.13 Existing Forest in Subwatershed

The second analysis involved looking at the forested regions. The purpose of this analysis was to determine, immediately, how many acres of forests existed on the site, and how many villages the forest could support with no intervention.

This analysis aimed to determine how many Bet-aves could fit on site (based on the framework) presuming the amount of forest that can be sustainably harvested, and used for heat, for an indefinite future. This study is different from the initial study that looked at the spatial footprint of the Bet-ave only. When comparing the two, we realize that pre-existing forest conditions cannot meet the demands of the 43 Bet-aves proposed in our first study.

Existing Surface Water in Subwatershed

Figure 10.14 Existing ground/surface water in Subwatershed

The third level of analysis was to look at existing water bodies. As was the case with the forest analysis, these were investigated to see how many villages the site could sustain, based on water availability alone. The purpose of these two studies (forest and water)was to see how many villages the site could sustain based upon the current conditions and with little to no engineering of water catchments basins. Because of the limited availability of water, the project of siting 43 Bet-aves will require the engineering of surface water systems to accommodate the Bet-ave footprints.

Existing Brownfields in Subwatershed

Figure 10.15 Brownfield map

A fifth study was conducted to examine the concentration of brownfields. This serves two purpose. One, the percentage of brownfields potentially begins to diminish the maximum potential sustaining capacity of the site. Two, in the spirit of not wasting agricultural land, it directs placement of new village centers where the adaptive reuse of brownfields is desirable.

Additionally, understanding location and amount of "brownfield" translates directly to deconstruction material salvage (C&D waste). If current population trends prevail, i.e. that population is decreasing in Delaware County, more homes and commercial centers will become abandoned. These brownfield sites become sites of material reclamation and re-use. If homes were deconstructed and warehoused properly, there could be an abundant amount of building materials and home economic artifacts (if salvaged) available to the population. This would supplement the bio-based and geologic materials found on site, especially if the total subwatershed population would decrease to the site-specific carrying capacity.

Forest and Water in Subwatershed

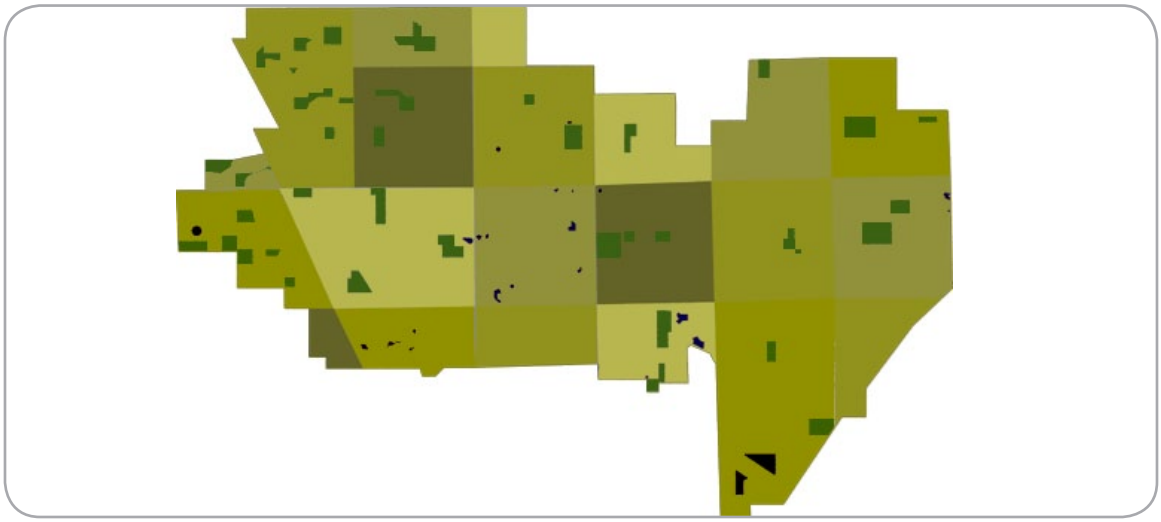


Figure 10.16 Forest and water map

A fourth analysis (comparative) looked at both the forest and the water bodies on site with the intention of identifying the potential points where both systems were existing in proximity to each other and then trying to determine the realistic placement of villages based upon the needs outlined in the nuclear family self sustaining module. Due to the clearing of forests and draining of standing water and wetlands, a site that was at one point able to support 4,000 people is currently only able to sustain 900 (three Bet-ave villages, 9 Bet-aves), especially if proximity is required because long range transport was unfeasible.

In order to develop this site to service the maximum Bet-ave footprint, forest growth and catch basin engineering is required . Therefore, we have the burden of needing to regenerate natural systems which pre-monarchic society did not have and therefore must put a greater emphasis on natural systems regeneration and conservation than they did.

Conclusions for land-planning

The site has been transformed in such a way that it performs well below its potential to sustain farming communities using basic technologies such as surface water supplies and a forest system for sustainably harvesting wood for a heat source. The potential for agrarian economy has been replaced by the larger industrial agricultural system which grows corn-syrup for processed foods and corn meal for beef and dairy. (The land transformation has proven successful for agriculture, but not for the environment.)

Secondly, because the existing sources of wood and water is so dispersed and disjointed, it may even be problematic to develop the three villages due to the need for excessive use of material transport– extremely problematic in the case of water.

Thirdly, the task of engineering the entire subwatershed landscape to allow for strategic ponding of water is immense. The patience and intense physical requirements of stewarding the growth of a fully balanced forest ecosystem is also demanding, perhaps, even more so (especially the tremendous amount of forest required for heating an entire subwatersed full of residents). Both tasks are impressively challenging and distant potentialities.

The key conclusion is this: there is a huge distance between the now and a sustainable future (as understood through our framework). In fact, it is daunting to think how far we are from social and environmentally sustainability – simply in this one small Indiana subwatershed- when it is understood through the lens of regional self-sufficiency.

Undoing a two hundred year American environmental transformation will not be accomplished in one lifetime. It is important to never underestimate how much time, talent and resources it will take to transform this one little subwatershed into a sustainable self-sufficient economy. When there is nearly no net profitability in such an endeavor, it is next to impossible.

For such a transformation to realistically take place it would require a great organization and financial resources to engineer the required water and forest resources. This would be a tremendous central planning effort in which legislative body would have to literally run rough-shod through an act of eminent domain over all private property rights, or a community based grassroots effort in the sense that every landowner would forfeit their control over their land for the sake of this project. Perhaps more realistically in American market conditions, it would require some visionary developer who could muster up the funding required to purchase all the land for the purposes of such a project.

The task is daunting, sustainability is daunting, and these factors indicate just how far we are from seeing sustainability become a reality, especially if we continue with business as usual and continue to deplete the natural economy.

All that being said, we will do a site design on a specific village location within the subwatershed. This model can be used in conjunction with planning efforts in the case such a project would be developed on this particular site or elsewhere. Furthermore, while surface water engineering and forest development is not a low impact development - it would be necessary to undertake and yet in line with the conservation value outlined in our report on Pre-Monarchic, Hebrew culture.

Typography and water flow in Subwatershed

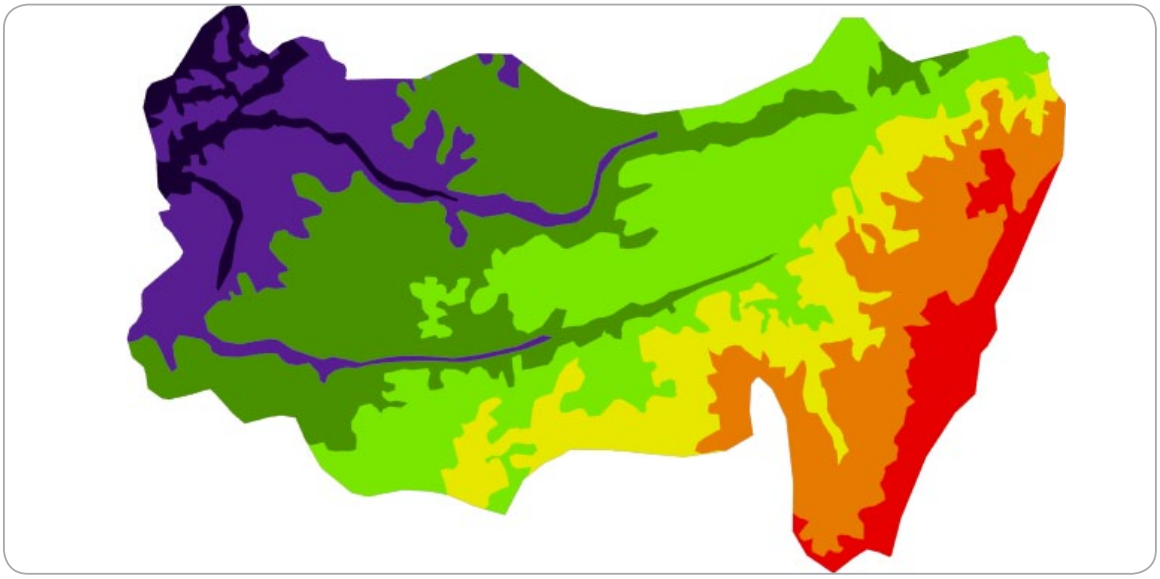


Figure 10.17 Topography map

A sixth study begins to enter into the realm of engineering and land augmentation. One of the key factors in developing the site for the maximum amount of users, based on carrying capacity, is water. A huge engineering project would be required as a prerequisite. This could be simplified by the removal of agricultural tiles and damming key points of the site to prevent water from flowing directly off the watershed (through the basin outlet located in the northwest corner of the site). It is also presumed that damming is the most efficient, cost effective, and low tech engineering strategy.

There are numerous opportunities for this damming to take place, but we are assuming it will be implemented at places that create the most water capture possible per damn while continuing to ensure decentralization of water bodies.

Creating water bodies in Subwatershed

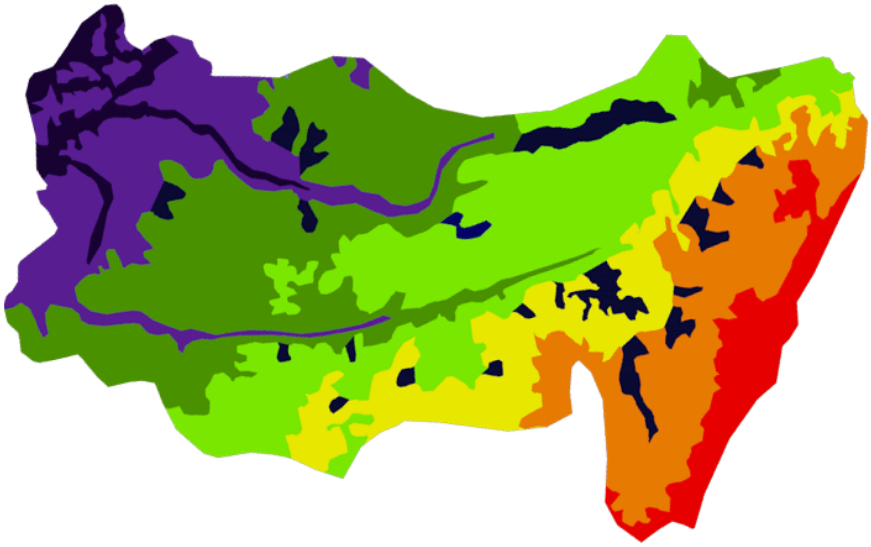


Figure 10.18 Location of water bodies

Considering the 43 Bet-aves (and 14 potentials villages) to be sited, the choice of how to create the necessary water bodies, to a large degree, influences the placement of the villages as some bodies will be sized to the point that they would necessitate multiple "village users".

As indicated by the above map, we have determined the location of the water bodies based on the aforementioned parameters and have begun to theorize the placement of the village based on the generic land-spatial requirements and the way those requirements related to the existing landscape augmented by the water bodies. (see following page)

Because of the versatility of a forest, the forest locations will be determined by the "left over" space resulting in the placement of the villages in relationship to water and the ethic of preserving prime agricultural land. (See forest section in site design.)

Siting villages in Subwatershed

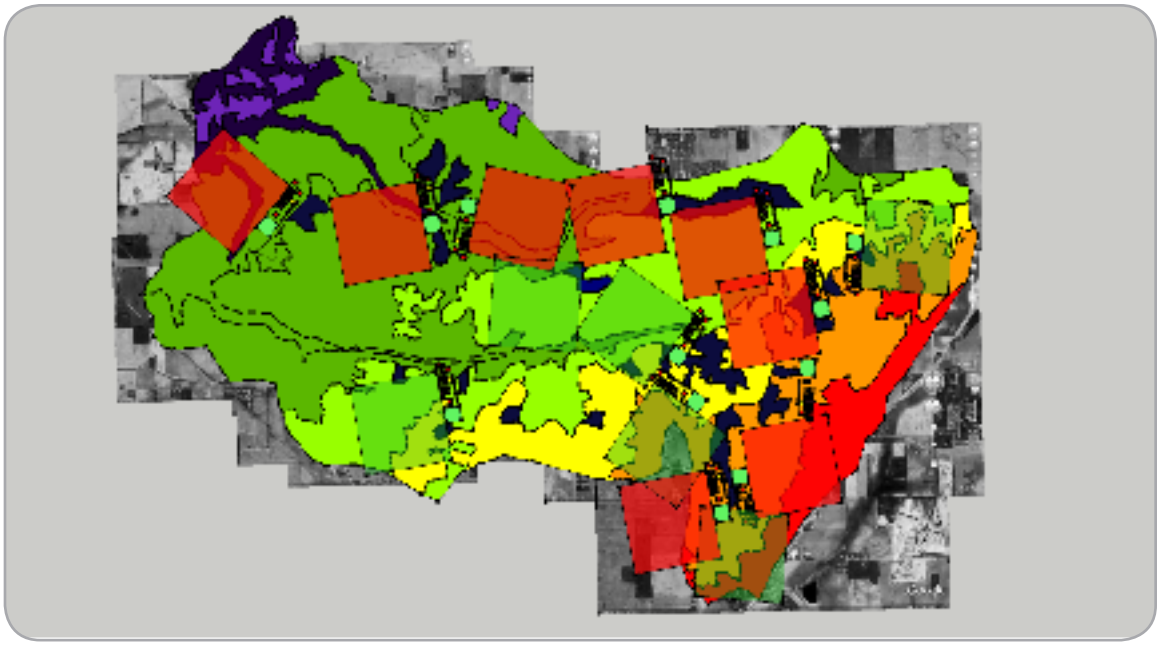


Figure 10.19 Village Locations based on water bodies

A generic placement of the 14 villages has been developed based on the proposed water bodies (water body sites were chosen for damming purposes and the least amount of engineering required on site). Due to the disproportionate water body sizes, the villages are more tightly clustered in certain areas than others - this reflects and earlier observation that organic evolving settlements follow resources availability (natural or man-made). The position of forests (for heat), in some cases, will require them to be distant from certain village centers. Because the harvesting and transfer of wood could be considered less intensive (in terms of frequency) than agriculture, it will be located in response to such rationale.

VILLAGE BOUNDARIES

11

Designing a Bet-ave village

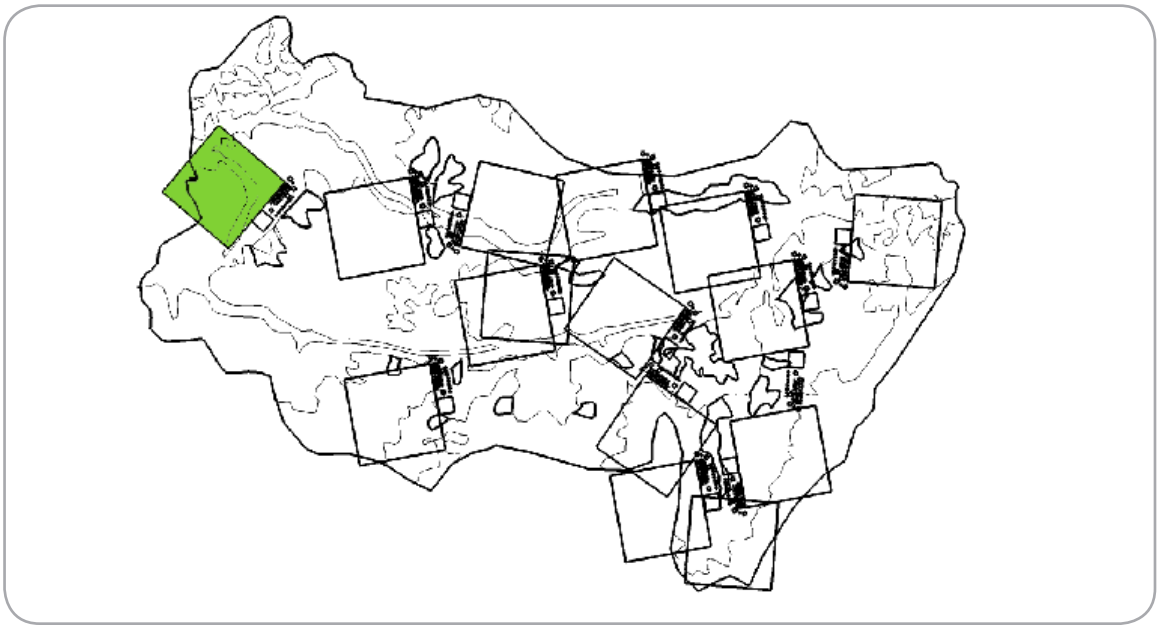


Figure 11.1 Village highlighted for site development

Rationale for selecting eastern village

1. There is a relatively existing ring of forest that can be expanded.

2. It is at the outlet of the watershed, so it could be used as a base for water quality control

3. It has the greatest potential for capturing water run off via the rivers as they diverge (ponding).

5. It has little brownfield development in an area generally dominated by farmers and small landholdings for the reason that it could be bought and developed.)

6. It is conveniently located off the beaten path (for a sense of privacy).

7. The existence of a "T-in-the-county-road" allows for some interesting relationships to the grid.

8. An abandoned railroad line borders the property and could be utilized if reactivated.

Summary of goals and objectives for village planning

DESIGN VALUE CATEGORIES

DECENTRALIZATION | LOW IMPACT DEV. | REGENERATION | ENERGY EFFICIENCY | CONSERVATION | HUMAN FACTORS

Goal: Minimize need for engineering

Objective: Avoid formal design.
Objective: Develop site based on environmental indicators such as topology and soil type. (Ex. Locate structures and roadways on soil suitable sites etc.)
Rationale: The village is essentially a low-density form of urban design characterized by simplicity and smallness. This is typically from the result of an organic evolution as opposed to a rigid, and imposed planning strategy. Therefore when designing a community with traditional village character one would avoid imposition of geometrical and rigid shapes. Any attempt to reduce engineering will help to off-set the large amount of engineering that is required to create the water bodies on site to meet water demands of the users. Additionally, this will decrease the amount of energy and financial resources required to create said patterns.
Objective: farm in areas designated as suitable soil.
Rationale: the preservation and use of land in sustainable ways for farming purposes preserve the long term productivity of the land.
Objective: Preserve existing county road system
Objective: Integrate Bet-ave access points to existing grid.
Objective: Site water bodies so that they are integrated with grid.
Rationale: Zero changes to the existing road way will reduce costs for engineering new road solutions.

Goal: Reduce material import

Objective: Utilize the existence of on site building materials
Rationale: The presence of topsoil, sand, gravel, wood, and the potential to grow bio-based materials (bamboo, straw bale, and switch grass) for construction will diminish dependency on external material resources.

Goal: Reduce material export

Goal: Treat waste on-site
Objective: Develop waste processing facilities (living machines) and designate compost areas and additional waste integration.
Rationale: Choose locations based on gravity fed systems or based on soil types that create the greatest opportunity for waste integration.
Objective: integrate waste

Objectives: vermiculture, dry toilets, composting

Goal: Conserve Energy

Objective: Reduce heating loads
Objective : locate trees to block winter winds
Rationale: because Muncie is located in a zone for heating first moves that prevent northwesterly winter winds are encourage through the placement of forest masses in the northwest sides of the site.
Goal: Maximize Passive Energy
Objective: Develop meta-site environment to allow for direct gain and passive cooling.
Rationale: Developing the village site with access to these resources will enable passive systems to function effectively at the individual architectural unit level.
Objectives: create earth massing around homes
Rationale: geothermal heating pipes can flow through earth massing and be used as a system to increase temperature in homes. Soil from the water bodies can be used to create such forms.
Objective: reduce cooling loads
Objective: locate homes and village structures north of major water bodies
Rationale: summer winds in the Midwest flow from the south west. If water is positioned properly these winds can be cooled while traveling into the heart of the village.

Goal: Preservation

Objective: Control run-off and use buffer strips on hardscapes, riparian buffers. Habitat systems.
Rationale: Preserve existing environmental conditions where possible to reverse environmental degradation trends and look for opportunities to regenerate native ecologies.
Objective: Create Environmental Edges
Objectives: Border forest, water, meadow and agriculture where possible.
Rationale: The overall environmental design driver is the creation of more edges (which are more productive socially, and ecologically since they promote/facilitate interaction). There should also be a visual equity of water bodies, expanded massing of linear wooded areas, and creation of a web of landscape that celebrates natural resources. Where possible, draw forests into community and thread throughout site
Goal: Naturalize Proposed Vegetation
Objective: Utilize native plants in biologically native arrangements.
Rationale: There should be a limited plant palette throughout the village with no geometrical augmentation. Plant material should be a foils against buildings. The landscape is naturalized but may be ordered. These natural scenes set up vantage, direct view, and screen to create center of interests.
Goal: Conserve water
Objective: rainwater capture and reuse, solar hot water heaters, grey water capture and reuse, living machines and run-off water treatment
Rationale: Water is a resource and requirement for sustainability (see framework)
Goal: Preserve existing water features.
Objective: Where possible use trail to create riparian buffers around all water features.
Goal: Preserve existing forest
Objective: When possible use wildlife corridors to link disjointed forests, thereby creating additional habitat.

Goal: Positive Human factors

Goal: Create public village space that functions as a inter village gathering space
Objective: Locate green space to be accessible to all three Bet-ave communities.
Rationale: There is typically a central green which creates a visual barrier or buffer. This enclosure, maintains a containment of views both inwards and outwards.
Goal: Create private village space that functions as a retreat space
Objective: locate site far way from public green space
Rationale: Our proposed contemplative space proposes an opportunity to interface with the past. This space tells the story of Pre-monarchic Israel, implied by what this project is – contains a portal through time, which bring out the contemporary connection. (Stargate)
Goal: Spatial Cohesion
Objective: Use green space to connect and stitch together the disjointed site suitabilities in order to bridge the connections between the various pieces of infrastructure that respond to natural features.
Rationale: While maintaining a sense of privacy between the three Bet-ave communities, greenway systems make pedestrian access easy and safe.
Goal: Use water features to increase sense of place
Objective: Make water bodies multifunctional as transit, and recreational centers.
Rationale: Amplify the sense of scenic views, edges, shorelines boundaries with a special attention to foreground, middle ground, and background
Goal: Use water as feature
Objective: create natural scenes using water
Rationale: Water is used in simple forms and mimic natural features, such as pond or streams.
Goal: Develop water resources on site
Objective: create ground/surface ponds to collect necessary water usage (see framework)
Rationale: The on site collection of water allows for self-sufficiency. Choose locations identified as pooling locations based on soil type.

Aerial Photography and Current Land-usage

Figure 11.2 Geographic Information Systems Aerial

Figure 11.3 Geographic Information Systems Aerial with overlays

Maps show the existing technological conditions at the site. Red determines housing/ brownfields and green: forests and rivers. As mentioned, this site is predominantly conventional agriculture and is not overloaded with brownfields.

Forest Inventory and Analysis

Image 11.1 Trees

Goal: Preserve existing forest
Objective: Do not augment existing forest cover and where possible connect disjointed forests with wildlife corridors

Goal: Water Preservation
Objective: Control run-off and use buffer strips on hardscapes, riparian buffers.
Habitat systems.

Figure 11.4 Geographic Information Systems

The existing forest will become the foundation for the regenerative effort required to develop a fuel resource for the entire Bet-ave village. Since the two streams converge on the site outlet, forest development can occur in conjunction with the development of riparian buffers.

Hydrology and Soils Analysis

Goal: Preserve existing water features.
Objective: Create riparian buffers around all water bodies. Consider topology when creating low tech opportunities for damming up the area for water supply development.

Image 11.2 Water

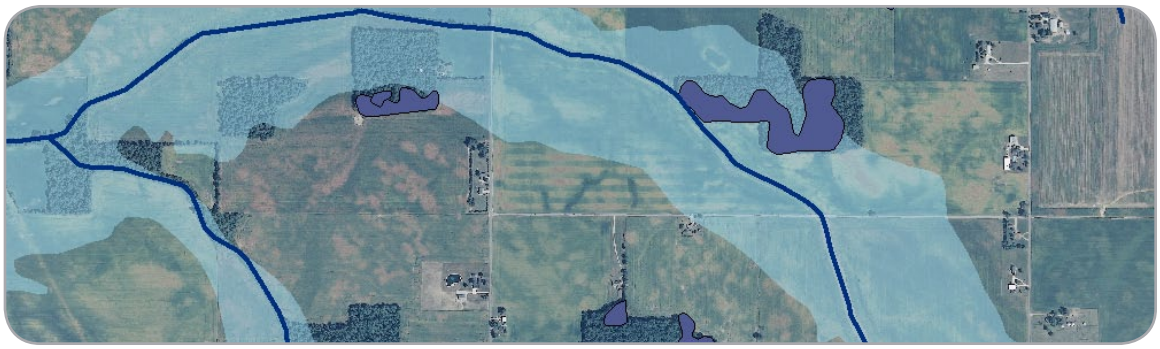


Figure 11.5 Water (GIS)

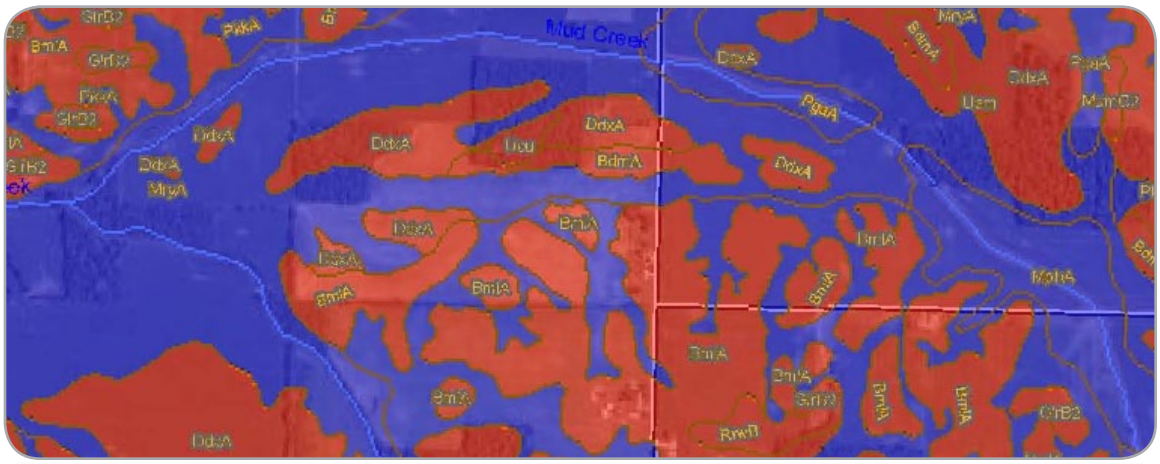


Figure 11.6 Water Ponding Areas (US Soil Survey)

The outlet of the entire subwatershed lies on the proposed site and the floodplain of this river is indicated in the light blue (gis). This light blue zone should be determined as a no build zone and it shall become reforested as a part of a regenerated wetland forest system.

A second figure shows the ponding potential of the site and indicates how waterbodies could be created based on points that already have potential for supporting ponds. (US Soilsurvey) This ponding site map also serves for indicating farming patterns.

Transportation

Image 11.3 Train

Image 11.4 County Road

Goal: Avoid engineering and formal design.
Objective: develop site based on environmental indicators such as topology and soil type. (Ex. Locate structures and roadways on soil suitable sites etc.)

Goal: Integrate road systems with the character of the village to create "place"
Objective: Make complete and livable streets that embrace both vehicles and pedestrians and make them safe for all.

Goal: Preserve existing county road system
Objective: Integrate Bet-ave access points to existing Jeffersonian grid.
Objective: Site water bodies so that they are integrated with Jeffersonian grid.

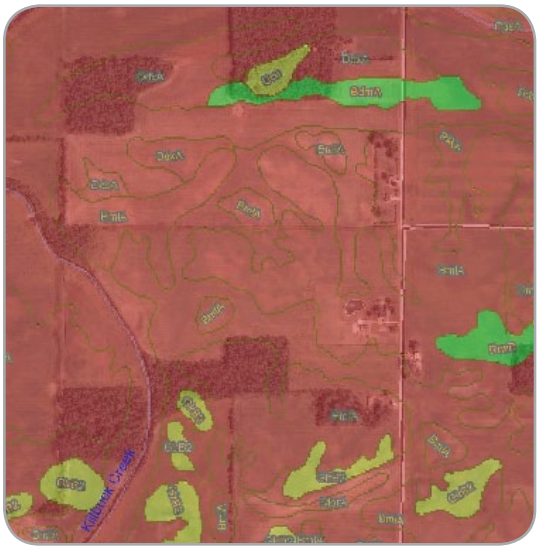


Figure 11.7 Road Suitability, USSS

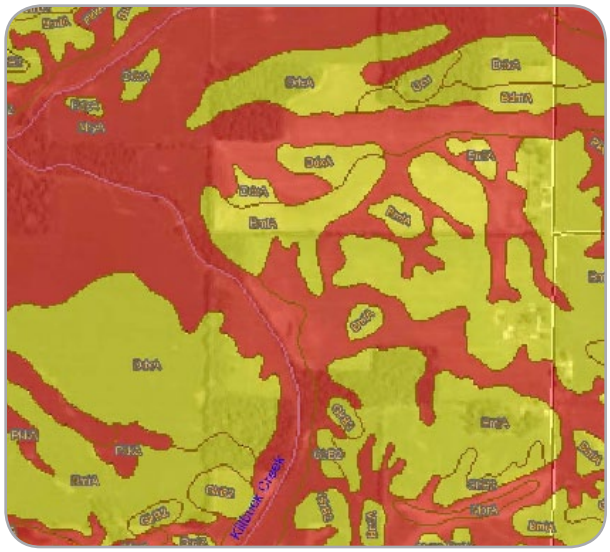


Figure 11.8 Trail Suitability, USSS

These maps indicate suitabilities for new roads and trails that will be considered for individual Bet-ave compounds. As mentioned, both the existing county road system as well as the deactivated rail line (in the event that it would also become reactivated) will be preserved.

Farming Analysis

Image 11.5 Farm

Goal: Minimize need for engineering
Objective: farm in areas designated as suitable soil.

Goal: Avoid engineering and formal design.
Objective: develop site based on environmental indicators such as topology and soil type. (Ex. Locate structures and roadways on soil suitable sites etc.)

Figure 11.9 Farming Suitability, US Soil Survey

Mechanical farming will continue to be used for row crops. The following maps outline best locations for pathways of the heavy machinery and, as it coincides with the ponding site map. These maps further direct the location of specific water hearty plants.

Materials

Goal: Reduce material import

Objective: Utilize the existence of on site building materials

Rationale: The presence of topsoil, sand, gravel, wood, and the potential to grow bio based materials (bamboo, straw bale, and switch grass) for construction will diminish dependency on external resources.

Image 11.6-14 Materials

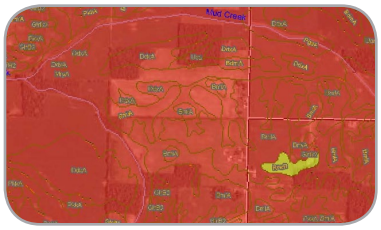


Figure 11.10 Sand USSS

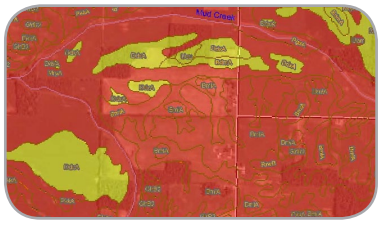


Figure 11.12 Gravel, USSS

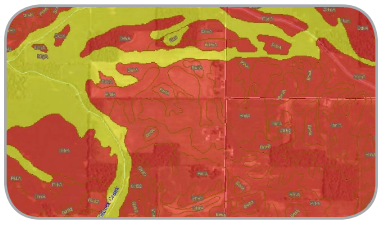


Figure 11.13 Stone, USSS

There are three major geologic resources to consider when identifying materials for building construction: sand, soil, and top soil. The sand and gravel could potentially be used in hardscape applications and the soil for rammed earth walls and flooring. There is also the potential to harvest wood resources for construction, growing hay (straw by product) for insulation and growing native bamboo for interior finishing and roof membranes. As mentioned in our brownfeilds study, the existing structures on site could be used for construction materials if deconststued properly. This may include salvaged wood and concrete (urbanite).

Low impact Development: Structures

Image 11.15 Bulldozer

Goal: Avoid engineering and formal design.

Objective: develop site based on environmental indicators such as topology and soil type. (Ex. Locate structures and roadways on soil suitable sites etc.)

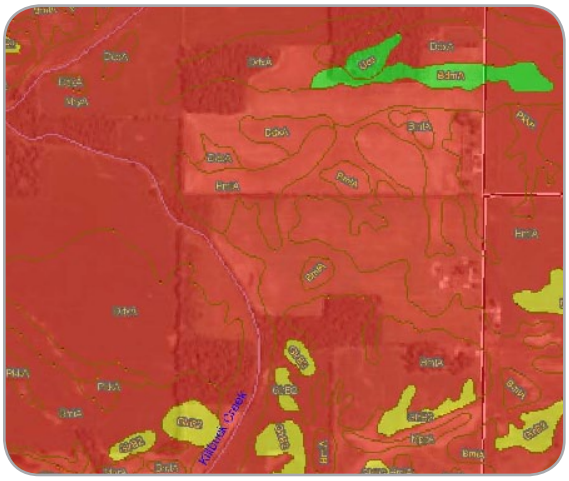


Figure 11.14 Structure, USSS

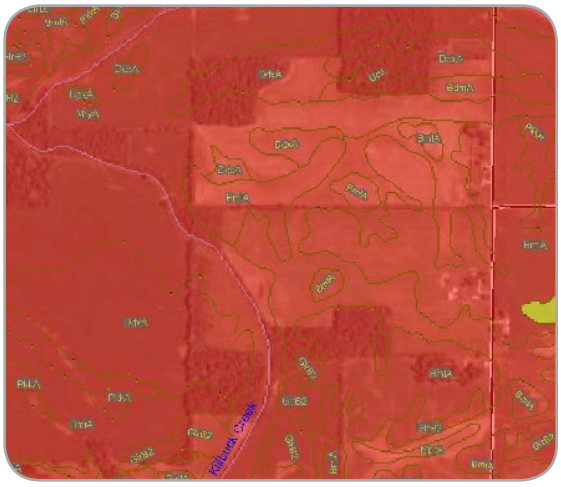


Figure 11.15 Shallow excavations, USSS

There are limited structural soils available for building housing or farming support structural systems. Fortunately this land footprint nearly matches the area required for the entire village (three Bet-aves). It is worh noting that only a small section of that land area footprint had the potential for basements. Roadways and path suitability coincide with the locations of structural supporting soils.

Waste

Image 11.16 Landfill

Goal: Treat waste on-site

Objective: Develop waste processing facilities (living machines) and designate compost areas and additional waste integration.

Image 11.17-18 Worms, eco-poty

Goal: integrate waste

Objectives: vermiculture, dry toilet, composting, soil fertility, soil food

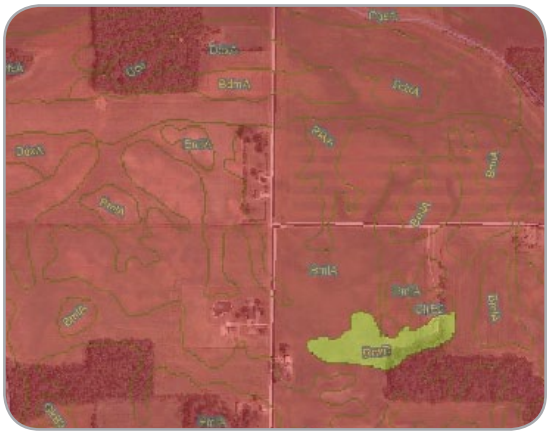


Figure 11.16 Sewage lagoons, USSS

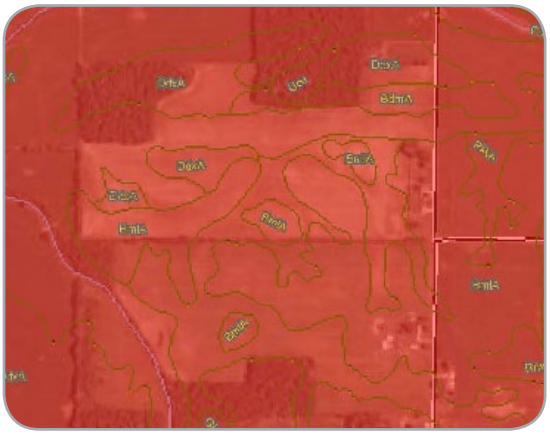


Figure 11.17 Septic, USSS

These maps indicate the ideal location for centralized waste processing sites in the village compound. If we presume total infrastructual decentralization at each Bet-ave module, each home would have its own waste management processes. Therefore, these sites could be used for non residential waste such as farming related waste.

Suitability Maps Combined

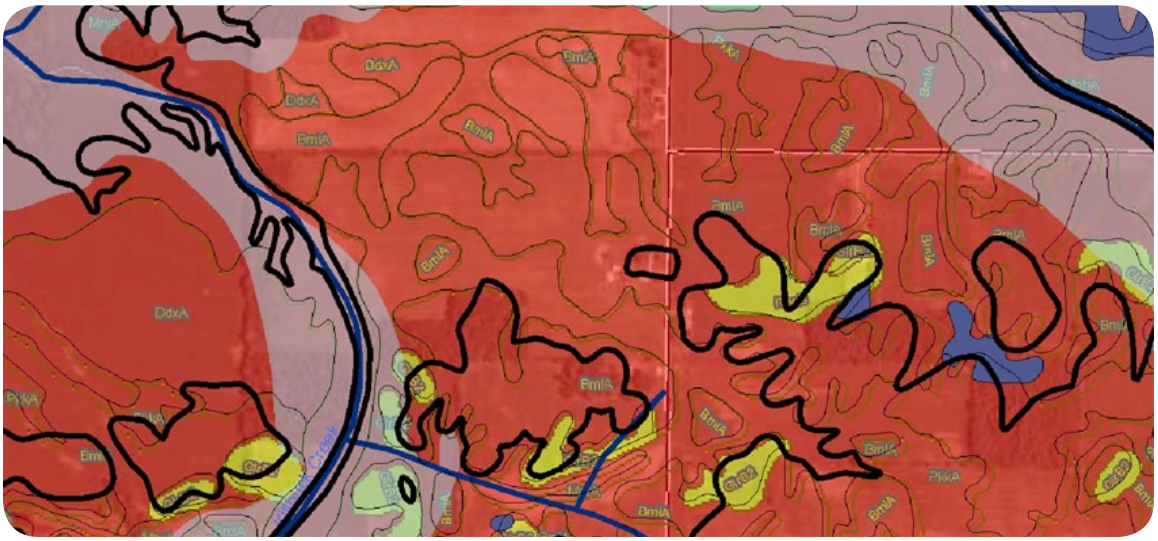


Figure 11.17 Suitability Map 1

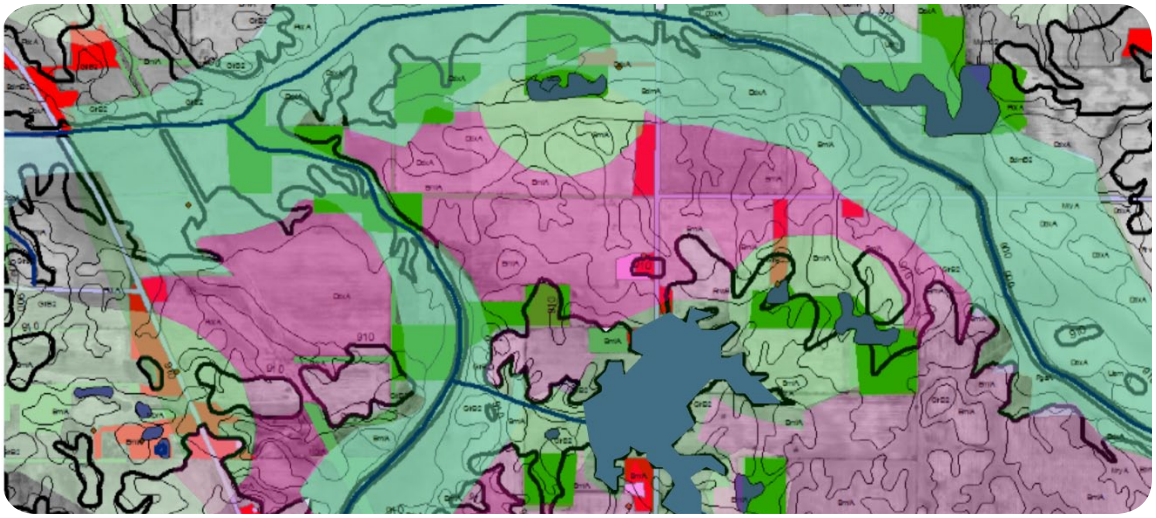


Figure 11.18 Suitability Map 2

The above maps were created to combine the site analysis data of existing conditions as guidelines for low impact development. In particular, these maps were created to define the limits of the site design and the boundaries as to where the community infrastructure are to sited and developed. Due to the desire for the project to be a low impact development and in response to nature, these factors were considered.

VILLAGE DESIGN

12

Avoid Formal Design / Engineering

Goal: Avoid engineering and formal design.

Objective: develop site based on environmental indicators such as topology and soil type. (Ex. Locate structures and roadways on soil suitable sites etc.)

Image 12.1 Bulldozer

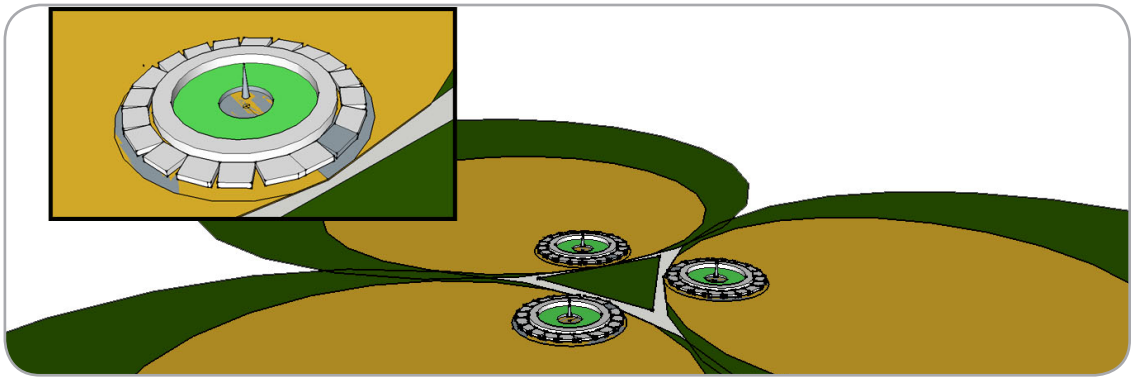


Figure 12.1 Formal Village Development, Radial

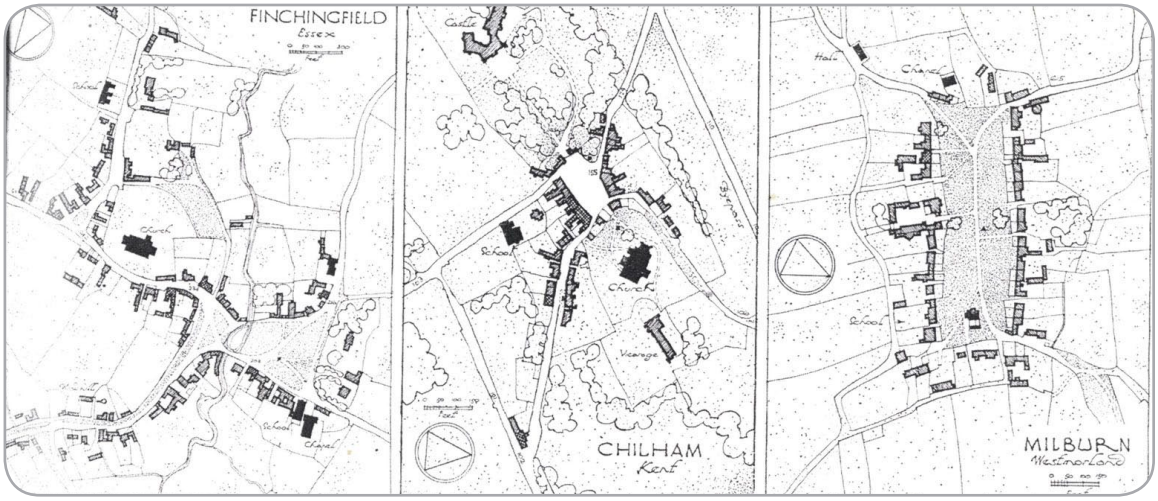


Figure 12.2 Anatomy of a Village

Mimicking the anatomy of a village precedent formally, for the sake of creating a "village pattern" is just as absurd as using a geometric form (such as the above radial proposal). It is important to consider natural features and not just simply impose out of context normative village patterns.

Open Channels for Passive Energy

Image 12.2-3 Wind and Sun

Goal: Maximize Passive Energy

Objective: Develop meta-site environment to allow for direct gain and passive cooling.

Objectives: create earth massing around homes

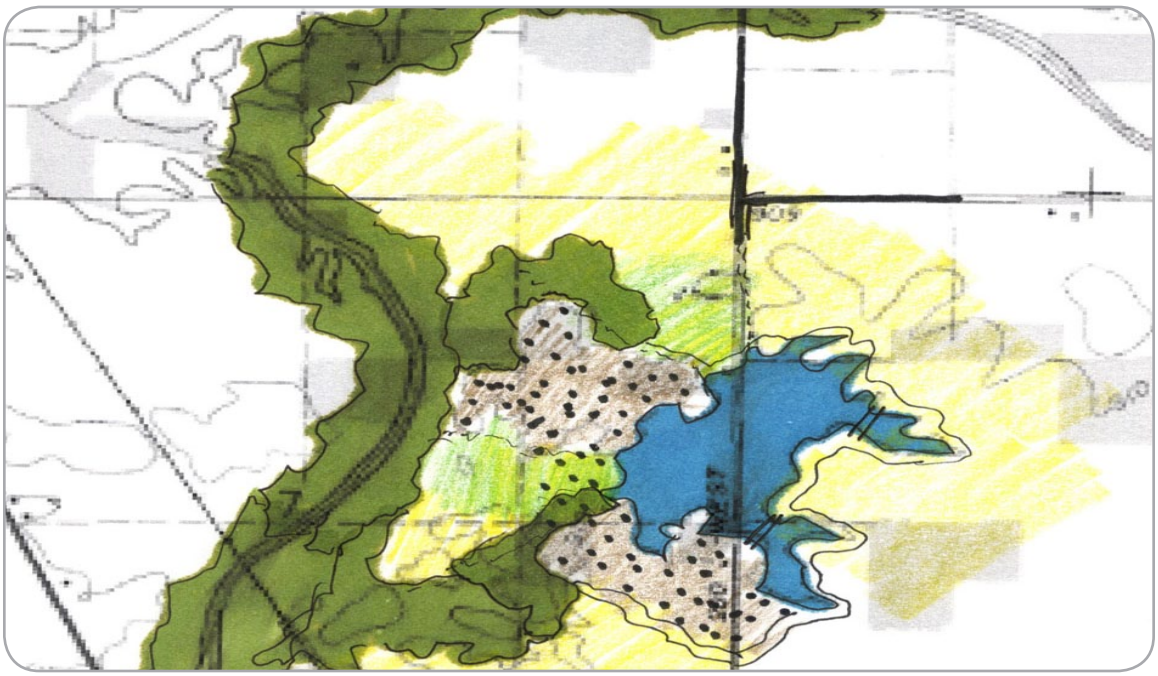


Figure 12.3 Schematic map showing, design intervention

Large scale passive energy decisions ("first moves") made at the village planning level will enable later site specific passive energy interventions to be implemented with ease. The key factors in passive energy spatial planning is wind and solar by way of opening up channels for wind and solar access. This access can fuel passive design systems as well as active systems that harvest their power. Additionally, cut from pond dredging will be used for geothermal purposes.

Maximize wind channels

Maximize solar channels

Geothermal resources

Integrate Natural Systems

Image 12.4 Trees

Goal: Preservation

Objective: Control run-off and use buffer strips on hardscapes, riparian buffers.

Habitat system

Image 12.5 Creek

Goal: Create Environmental Edges

Objectives: Border forest, water, meadow and agriculture where possible.

Image 12.6 Lily pads

Goal: Naturalize Proposed Vegetation

Objective: Utilize native plants in biologically native arrangements.

Figure 12.4 Design Exploration

Existing natural features such as forest and wetlands will be preserved. Due to the fact that additional forests will need to be regenerated to meet heating fuel demands, this regeneration can be used strategically to connect and expand existing features into a integrated forest wetland system.

WETLAND PRESERVATION

RIPARIAN BUFFERS

WILDLIFE CORRIDORS

Human Factors: Green Space

Image 12.7 People

Goal: Create public village space that functions as a inter village gathering space

Objective: Locate green space to be accessible to all three Bet-ave communities.

Image 12.8 Trees

Goal: Create private village space that functions as a retreat space

Objective: locate site far way from public green space

Goal: Spatial Cohesion

Objective: Use green space to connect and stitch together the disjointed site suitabilities in order to bridge the connections between the various pieces of infrastructure that respond to natural features.

Image 12.9 Park

Goal: Use water features to increase sense of place

Objective: Make water bodies multifunctional as transit, and recreational centers.

Image 12.10 Stream

Goal: Use water as feature

Objective: create natural scenes using water

Goal: Develop water resources on site

Objective: create ground/surface ponds to collect necessary water usage (see framework)

The existing and proposed supplemental forests and wetlands will simultaneously be used as green space for both active and passive recreation. Because the proposed natural systems will be designed in the English garden / restorative traditions, there is great opportunity for these to be natural spaces that have biophillic qualities.

Alternatives: Implementing Goals

Figure 12.5 Design Exploration (Cross Pattern)

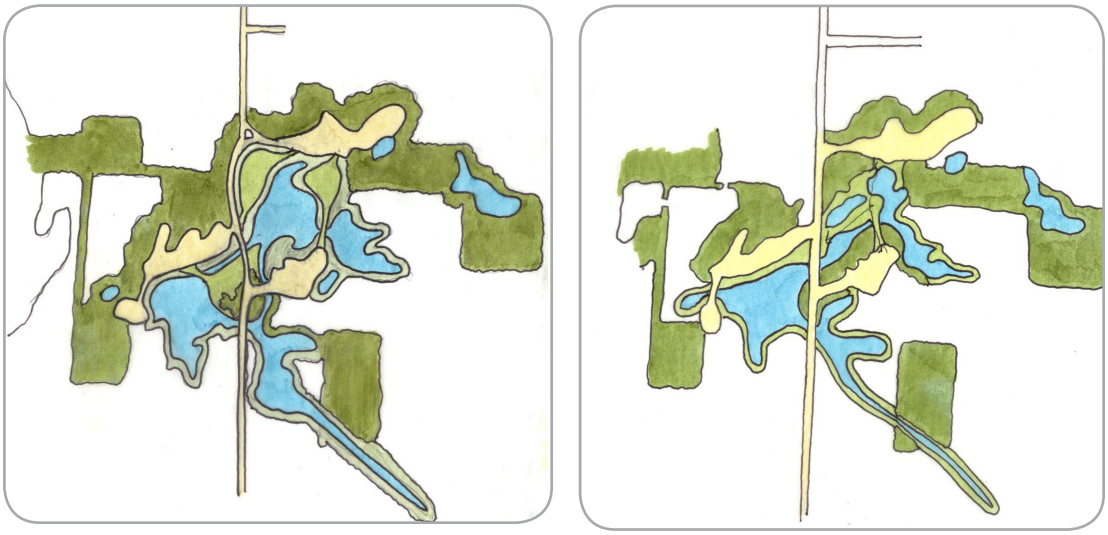


Figure 12.6 / 12.7 Design Exploration (Radial Patterns)

Three alternatives were developed at the schematic level to explore the various means of regenerating natural systems and using these natural systems to integrate the suitable building areas for the purposes of creating overall village cohesion.

Final Village Planning

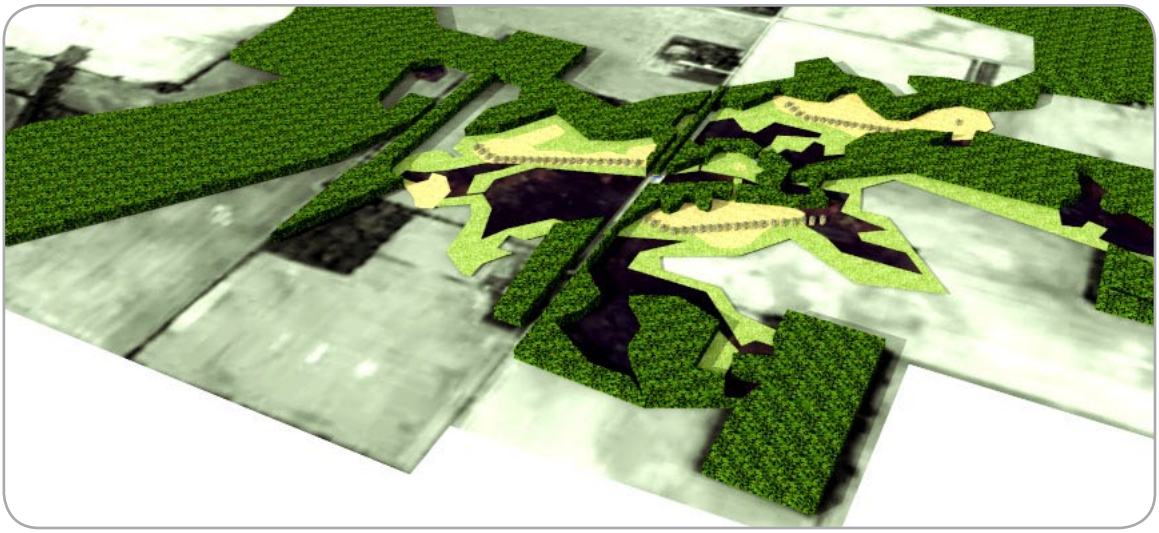


Figure 12.8 Village Proposal

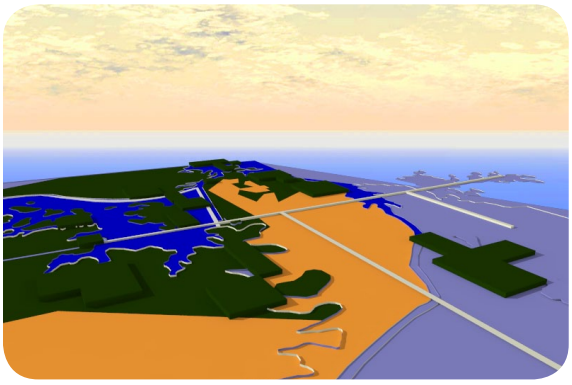


Figure 12.9 Village Proposal

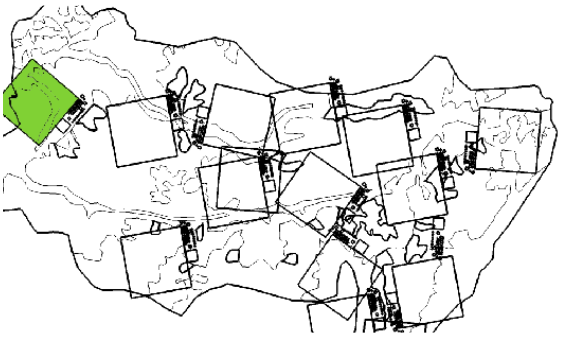


Figure 12.10 Chosen Site

A final alternative was chosen to represent the ideal conditions for the village. In this scenario all of the soil suitabilities are honored. This creates locations for the proposed three Bet-ave compounds. Natural systems are regenerated around these buildable areas to enable passive energy strategies that will be designed into the compound architecture. Finally, these natural systems also create a greenspace network that unifies the village into one cohesive unit. This greenspace (and water system) will function as both recreation and inter village transport.

BET-AVE DESIGN

13

Site Development Progression

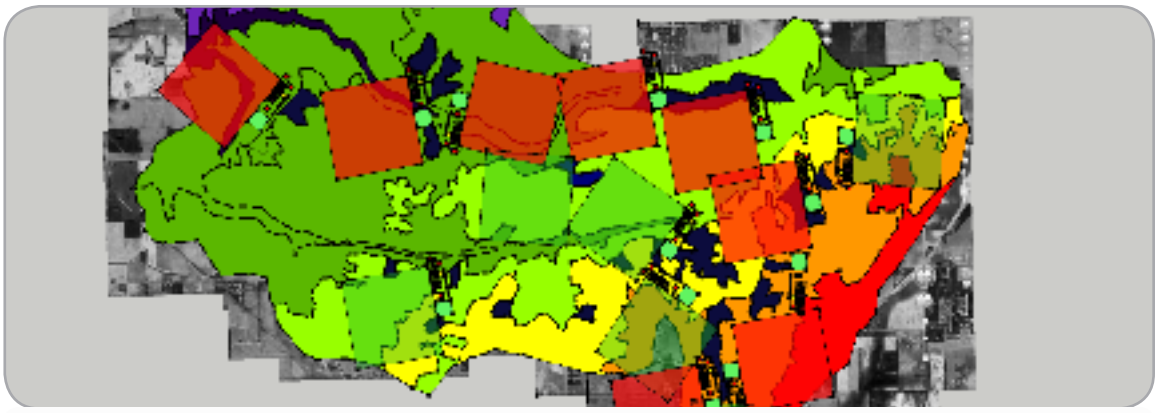


Figure 13.1

Regional Village Placement

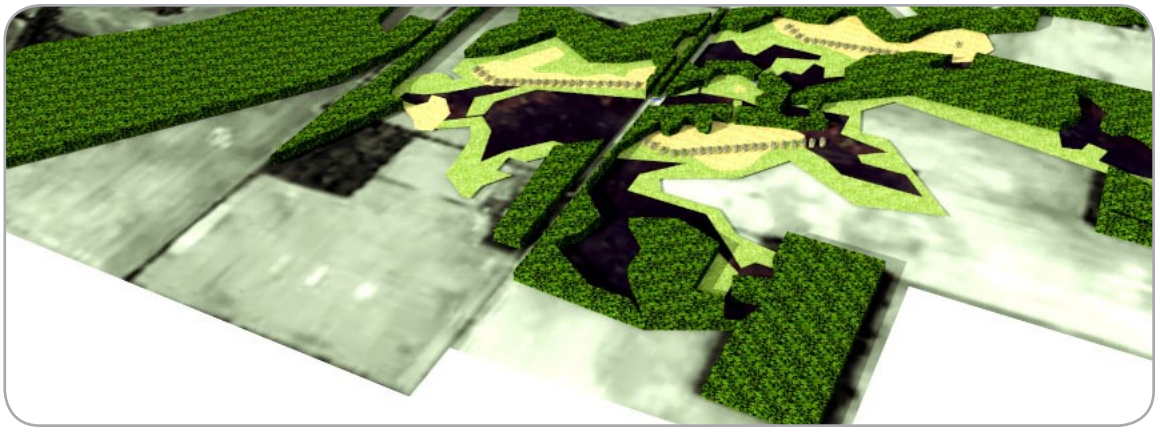


Figure 13.2

Eastern Village Design

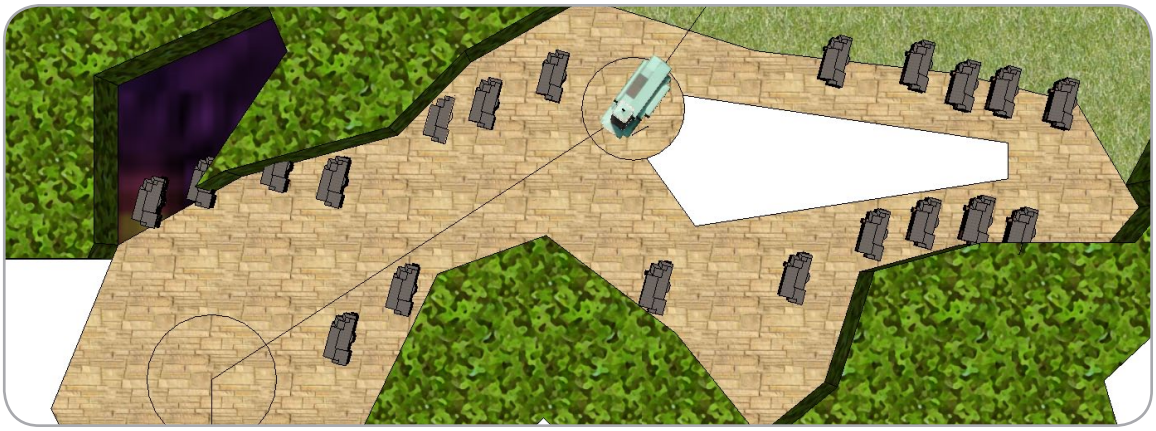


Figure 13.3

Site of Bet-ave Development (north compound)

Bet-ave Sites Not Selected

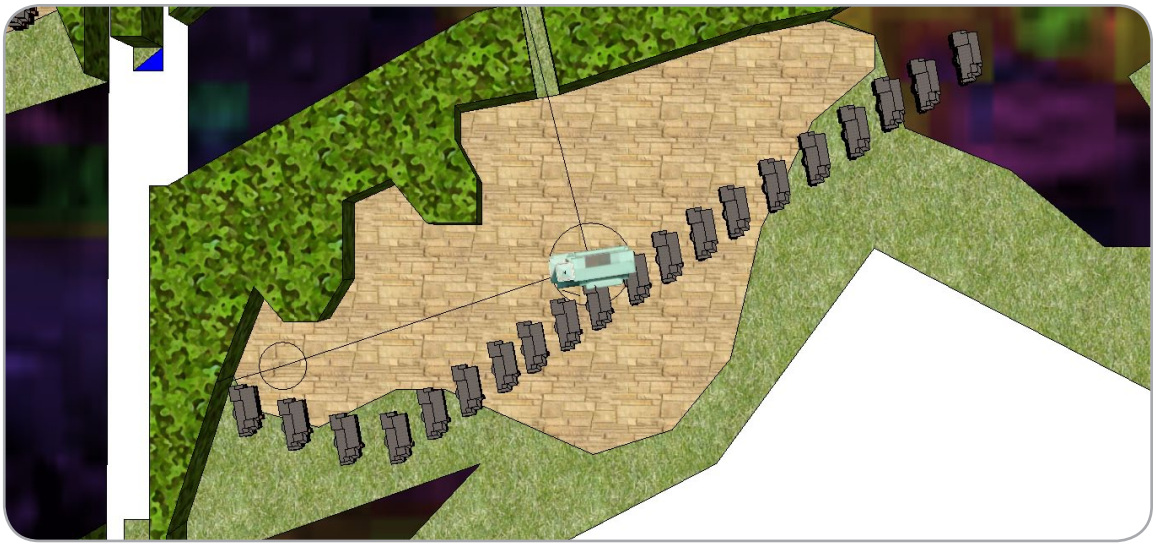


Figure 13.4 Southern Bet-ave

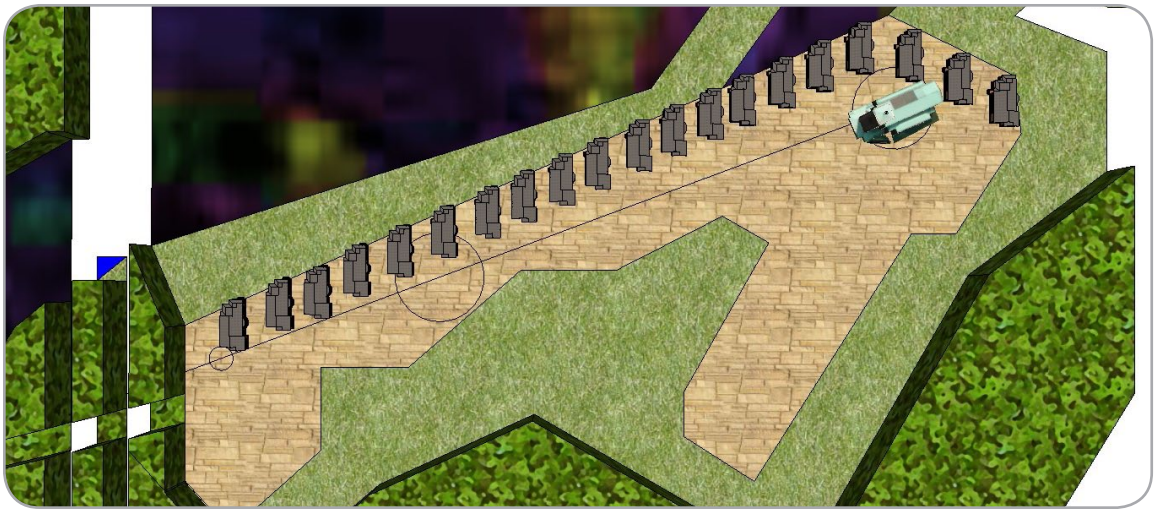


Figure 13.5 Western Bet-ave

The north and east compounds within the village were identified but not selected for further design development. These sites are sized to contain the Bet-ave "core" (residential and village functional program). Yet, because each of the suitable areas are not equal in size, various degrees of density would be required to fit all architectural elements on the site. This reinforces the notion that environmental indicators can drive design when "designing with nature" or in the spirit of low impact development.

Summary of goals and objectives

DESIGN VALUE CATEGORIES

DECENTRALIZATION | LOW IMPACT DEV. | REGENERATION | ENERGY EFFICIENCY | CONSERVATION | HUMAN FACTORS

Food

Goal: grow all food on site
Objective: farming, animal
Rationale: achieving self-sufficiency.

Water Resources

Goal: Develop water resources on site
Objective: create ground/surface ponds to collect necessary water usage (see framework)
Rationale: The on site collection of water allows for self-sufficiency. Choose locations identified as pooling locations based on soil type.
Goal: Conserve water
Objective: rainwater capture and reuse, solar hot water heaters, grey water capture and reuse, living machines and run-off water treatment
Rationale: Water is a resource and requirement for sustainability (see framework)

Treat Waste On-Site

Goal: Treat waste on-site
Objective: Develop waste processing facilities (living machines) and designate compost areas and additional waste integration.
Rationale: Choose locations based on gravity fed systems or on soil types that create greatest opportunity for waste integration.
Goal: integrate waste
Objectives: vermiculture, dry toilet, composting,
Goal: Reduce material import
Objective: Utilize the existence of on site building materials
Rationale: The presence of topsoil, sand, gravel, wood, and the potential to grow bio-based materials (bamboo, straw bale, and switch grass) for construction will diminish dependency on external material resources.

Energy

Goal: Maximize Passive Energy
Objective: Develop meta-site environment to allow for direct gain and passive cooling.
Rationale: Developing the village site design with access to these resources will enable passive systems to function effectively at the individual architectural unit level.
Objective: orient homes and landscape feature to allow for solar gain
Rationale: Sun exposure on the South side of the site allows for solar gains in both the residential community building and other structures in compound.
Objectives: create earth massing around homes
Rationale: geothermal heating pipes can flow through earth massing and be used as a system to increase temperature in homes. Soil from the water bodies can be used to create such forms.
Objectives: Shade streets and buildings

with deciduous trees
Rationale: The reduction of hardscape heat gain during summer days can make space more comfortable and decrease cooling demands.
Goal: Reduce heating loads
Objective : locate trees to block winter winds
Rationale: because Muncie is located in a zone for heating first moves that prevent northwesterly winter winds are encourage through the placement of forest masses in the northwest sides of the site.
Goal: reduce cooling loads
Objective: locate homes and village structures north of major water bodies
Rationale: summer winds in the Midwest flow from the south west. If water is positioned properly these winds can be cooled while traveling into the heart of the village.
Objectives: Shade streets and buildings with deciduous trees
Rationale: The reduction of an areas heat gain during summer days can make space more comfortable and decrease cooling demands.
Objective: orient streets, where possible, to permit summer winds to channel into residential areas.
Rationale: the summer winds, cooled by the water bodies, can be channeled and flowed into the streetscape of the city.
Goal: Produce net energy (from passive gains on site)
Objective: Generate energy from wind and solar energy for active systems.
Rationale: Developing the village site design to provide access to these resources will enable active solar and wind systems to function effectively at the individual architectural unit level.

Low Impact Development

Goal: Avoid engineering and formal design.
Objective: develop site based on environmental indicators such as topology and soil type. (Ex. Locate structures and roadways on soil suitable sites etc.)
Rationale: The village is essentially a low-density form of urban design characterized by simplicity and smallness. This is typically from the result of an organic evolution as opposed to a rigid, and imposed planning strategy. Therefore when designing a community with traditional village character one would avoid imposition of geometrical and rigid shapes. Any attempt to reduce engineering will help to compensate large amount of engineering that is required to create the water bodies on site to meet water demands of the users. Additionally, decrease the amount of energy and financial resources required to create said patterns.
Goal: Preserve existing county road system
Objective: Integrate Bet-ave access points to existing grid.
Objective: Site water bodies so that they are integrated with grid.
Rationale: Zero changes to the existing road way will reduce costs for engineering new road solutions.
Goal: Integrate road systems with the character of the village to create "place"
Objective: Make complete and livable streets that embrace vehicles and make them safe for pedestrians.
Rationale: Villages contain roads, and are not buildings pushed aside from it. The turns in the road make places and common buildings accent these places. Roads should prevent a vista from running through the entire length of the village.
Goal: Minimize need for engineering

Objective: farm in areas designated as suitable soil.
Rationale: the preservation and use of land in sustainable ways for farming purposes preserve the long term productivity of the land.
Goal: Integrated built-site relationship
Objective: Maximize passive systems, generate power one site, capture water, and process waste for each architectural unit. (See energy demands in framework)
Rationale: Limits need for large centralized infrastructure to provide said resources and encourage frugal usage of energy. See LDI straw bale learning lab precedent and incorporate various concepts from the green studio handbook.

Preservation

Objective: Control run-off and use buffer strips on hardscapes, riparian buffers. Habitat systems.
Rationale: Preserve existing environmental conditions where possible to reverse environmental degradation trends and look for opportunities to regenerate native ecologies.
Goal: Create Environmental Edges
Objectives: Border forest, water, meadow and agriculture where possible.
Rationale: The overall environmental design driver is the creation of more edges (which are more productive socially, and ecologically). There should be a visual equity of water bodies. Expanded massing of linear wooded areas. Creating a web of landscape that celebrates natural resources. Where possible, draw forests into community and thread throughout site
Objective: when possible use low impact farming techniques like permaculture to regenerate land.
Objective: utilize erosion control techniques in designated traditional farming sites. Contour farming, no till etc.
Objective: separate industrial farming operations from city center and residential areas.
Objective: conserve energy and labor through location
Rationale: the permaculture principals will be located near to the main residential structures and village center while the large farming centers will be located far enough to create separation from the industry but near enough for easy access. This is also a gradient for the most intensive purposes and demands.
Goal: Naturalize Proposed Vegetation
Objective: Utilize native plants in biologically native arrangements.
Rationale: There is a limited plant palate throughout the village with no geometrical augmentation. Plant material is foils against buildings. The landscape is naturalized but may be ordered. These natural scenes set up vantage, direct view, and screen to create center of interests.

Human Factors

Goal: Self-Sufficiency
Objective: Provide all survival based goods and services.
Rationale: It engages in activities that are required for its own sustenance. (ANV) When a village takes on additional economic activities (for export) it becomes a town, (scaled to the degree of additional activity it undertakes.)
Goal: Growth Boundaries
Objective: Limit to 100 persons (Bet-ave) or 300 for village.
Rationale: The size of a traditional village is normatively scaled for a 300-400 person carrying capacity
Goal: Value resident privacy
Objective: single family detached hous-

ing
Rationale: There are disadvantages and advantages to detached nuclear family houses. The forfeit the advantage of the economy in public services, attached gables, and general footprint economy, but have the advantage of privacy.
Goal: village center
Objective: cluster decentralized architectural units
Rationale: importance of a village center
Community center
Public private gradients
Goal: Create public village space that functions as a inter village gathering space
Objective: Locate green space to be accessible to all three Bet-ave communities.
Rationale: There is typically a central green which creates a visual halt meaning you can't see through it. This enclosure, maintains a containment of views both inwards and outwards.
Goal: Create private village space that functions as a retreat space
Objective: locate site far way from public green space
Rationale: Our proposed contemplative space proposes an opportunity to interface with the past. This space tells the story of Pre-monarchic Israel, implied by what this project is – contains a portal through time, which bring out the contemporary connection. (Stargate)
Goal: Spatial Cohesion
Objective: Use green space to connect and stitch together the disjointed site suitabilities in order to bridge the connections between the various pieces of infrastructure that respond to natural features.
Rationale: While maintaining a sense of privacy between the three Bet-ave communities and greenway systems makes pedestrian access easy and safe.
Goal: Use water features to increase sense of place
Objective: Make water bodies multifunctional as transit, and recreational centers.
Rationale: Amplify the sense of scenic views, edges, shorelines boundaries with a special attention to foreground, middle ground, and background
Goal: Use water as feature
Objective: create natural scenes using water
Rationale: Water is used in simple forms and mimic natural features, such as pond or streams.
Goal: Architecture is simple
Objective: Non-elaborate, simple, and is neither monuments or pretentious. It maintains limit on height, spatial position, the use of strict lines, and maintain a limited spectrum of color.
Rationale: Architecture is simple and contextual to environmental scale and functions of the village. The architectural character is driven by its relative scale. And sized for functional purposes.
Goal: Design for Midwestern aesthetic objectives: Features (Village pump, Covered well, Market hall, old barns, tree lines, fence lines, farm ponds, silos, swing on tree)
Objective: Consider the Prairie Style Design School (popularized by F.L. Wright)
Rationale: To make project marketable, it needs to appeal to Midwestern tastes and reflect the Midwestern people and culture
Goal: Decentralize infrastructure
Objective: while it is fair to group architectural units break them into functional areas.
Rationale: All social buildings are decentralized except college. Most public buildings are groups in a central location.

Program Precedents

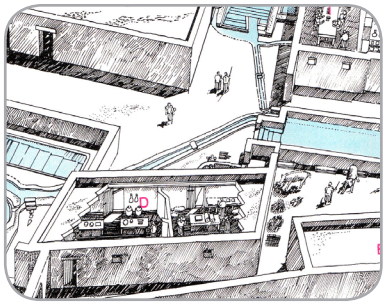


Image 13.1 Quamram

Image 13.2 Kibbutz

Image 13.3 Co-housing

Quamram community

In the book "The great people of the bible and how they lived", various conceptual drawings were presented to give visual dimensions to various archeological findings that correspond to time periods in the biblical literature. These visual representations begin express the vernacular of middle eastern architecture and material culture at the time. While it may be advantageous to explore these models what is more important is to understand the nature of designing architecture that is of a vernacular of a particular region. The vernacular of Midwestern America will be explored and used as a guiding design framework as opposed to just recreating a societal pattern that exists in a very different environmental context.

Kibbutz

The Kibbutz and Moshav are contemporary expressions of Israeli settlement that are also loosely based on normative Biblical Values and were designed to be self-sufficient. However, the kibbutz was created in response to specific social pressures and was created to satisfy the modern Israelis socioeconomic values and needs. (The diaspora)

While the value and design drivers behind kibbutz shares a lot in common with our own design precedent. Simply advocating the kibbutz in contemporary America is not enough. As there is a need to integrate architectural designs in to specific environmental contexts (to avoid out of context and forced formal planning) There is a also a need to place the rationale for sociological values into the context of the dominant culture of its users. For that reason, this project is not advocacy for a kibbutz (or any other intentional community out side Pre-monarchic Israel, , but for a socioeconomic order based on Pre-Monarchic literature itself. It is important to note that there are numerous other examples of intentional communities built on interpretation of biblical values in the history of community planning, especially the Amish and Amana colonies which also find their expression in a Midwestern context yet were designed in response to particular social pressures and values as well. . To reiterate, this project seeks to make the case for the Pre-monarchic order in response to the stratification of ownership of capital in American society.

Co-housing

The co-housing movement in America is another example of intentional community development. While the movement does not have self-sufficiency as a design component, it does offer program inspiration and spatial planning precedent.

Contemporary Villages: Eco Resorts

Image 13.4 Eco-resort

Developing program

We will now turn our attention to resort planning. While it may seem to be an odd link between self-sufficient agrarian communities and resort planning, it must be noted that aside from producing its own goods, resorts offer all the amenities for vacationers that one would be needed for 'quality of life issues' on site. This begins to articulate village functional requirements besides agriculture.

Because resort planning is a multimillion dollar business. There is also quite a lot of literature on the programmatic structures and requirements. The size and square footage of major village components were taken directly from such case studies.

The resort planning literature outlines four functional dimensions of a resort and their spatial dimensions are as follows:

The entry foyer: lobby, main offices, and orientation for visitors including retail and deli
Functional facilities: such as banquet halls and breakout rooms.
Food: kitchen area and restaurants.
Back of house: Utilities and operational functions.

While these square footage numbers and functional concepts serve us in our development of a theoretical Bet-ave compound, it is important to note that if such a project would actually be developed, these numbers, and proposed functions, would be refined and tailored to the specific users of the Bet-ave.

Contemporary Villages: Eco Resorts

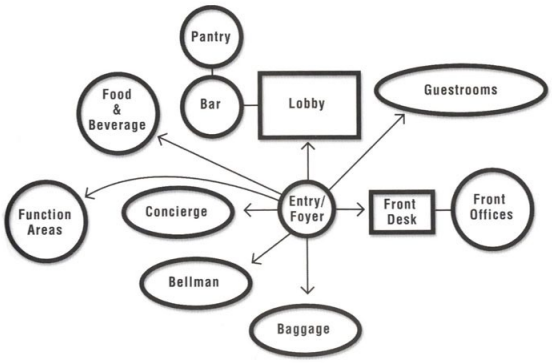


Figure 13.6 Lobby, McDonough

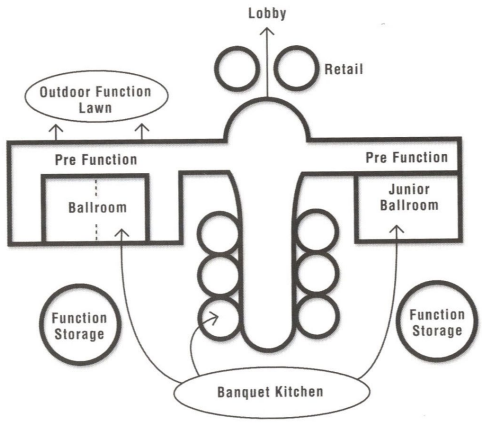


Figure 13.7 Functions, McDonough

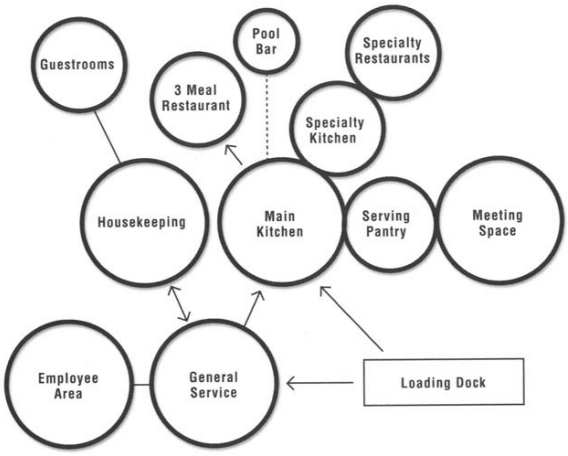


Figure 13.8 Food, McDonough

These diagrams are considered when laying out the functional attributes of the Bet-ave compound. Their corresponding square footage recommendations incorporated in this project. The next three pages displays a list of individual compound components that will be designed into the Bet-ave along with their aesthetic qualities based upon the Village study precedent and the mid western vernacular. The final program selection is based on the synthesis of the various design precedents explored throughout this project process.

Program Elements Summary

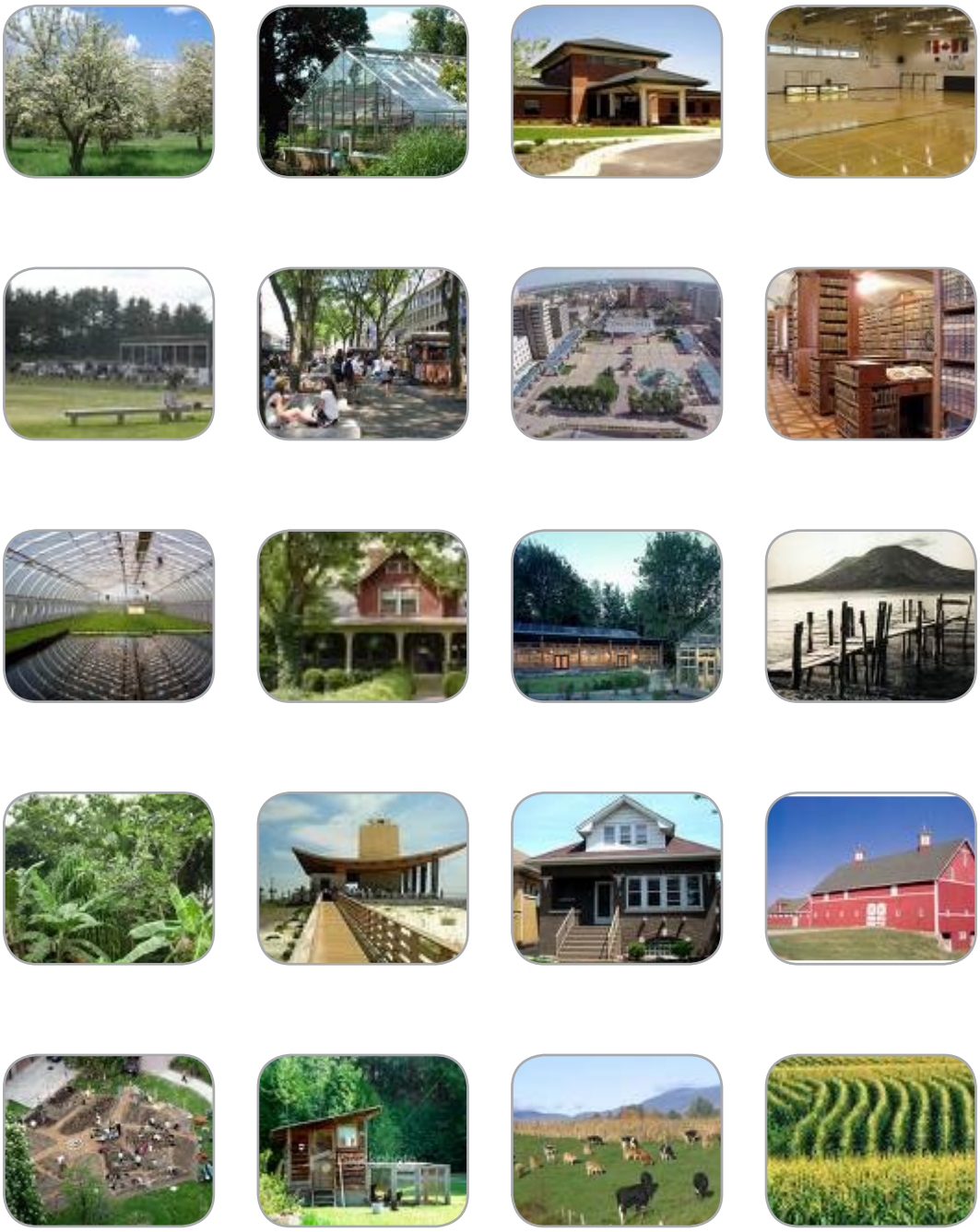


Image 13.5-24 Program Elements

Village Aesthetic and Quality

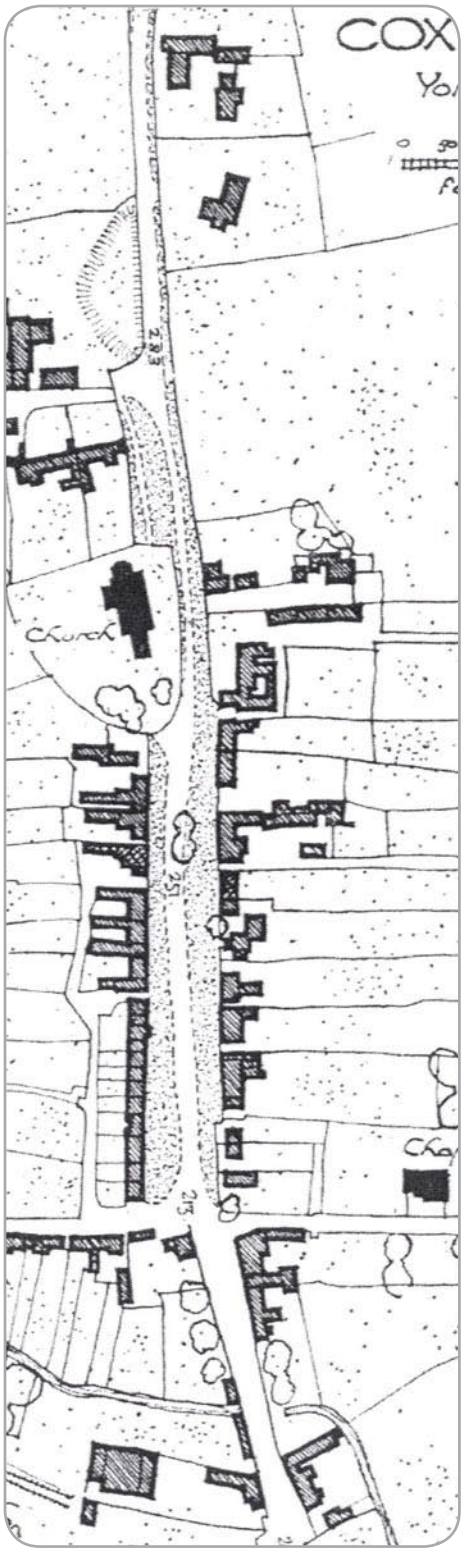


Image 13.25 Village

Goal: Architecture is simple
Objective: Non-elaborate, simple, and is neither monuments or pretentious. It maintains limit on height, spatial position, the use of strict lines, and maintain a limited spectrum of color.

Goal: Decentralize infrastructure
Objective: while it is fair to group architectural units break them into functional areas.

Goal: Minimize need for engineering
Objective: farm in areas designated as suitable soil.

Goal: Avoid engineering and formal design.
Objective: develop site based on environmental indicators such as topology and soil type. (Ex. Locate structures and roadways on soil suitable sites etc.)

Goal: village center
Objective: cluster decentralized architectural units

Goal: Create public village space that functions as a inter village gathering space
Objective: Locate green space to be accessible to all three Bet-ave communities.

Goal: Create private village space that functions as a retreat space
Objective: locate site far way from public green space

Goal: Spatial Cohesion
Objective: Use green space to connect and stitch together the disjointed site suitabilities in order to bridge the connections between the various pieces of infrastructure that respond to natural features.

Goal: Use water features to increase sense of place
Objective: Make water bodies multifunctional as transit, and recreational centers.

Goal: Use water as feature
Objective: create natural scenes using water

A Midwestern Aesthetic defined

Goal: Design for a Midwestern Aesthetic
Objectives: Features (Village pump, Covered well, Market hall, old barns, tree lines, fence lines, farm ponds, silos, swing on tree)
Objective: Consider the Prairie Style Design School (popularized by F.L. Wright)

Goal: Value resident privacy
Objective: single family detached housing

Image 13.26-34 Aesthetic

Farming Methodologies

Image 13.35 Farm

Objective: when possible use low impact farming techniques like permaculture to regenerate land.

Objective: utilize erosion control techniques in designated traditional farming sites. Contour farming, no till etc.

Objective: separate industrial farming operations from city center and residential areas.

Objective: conserve energy and labor through location

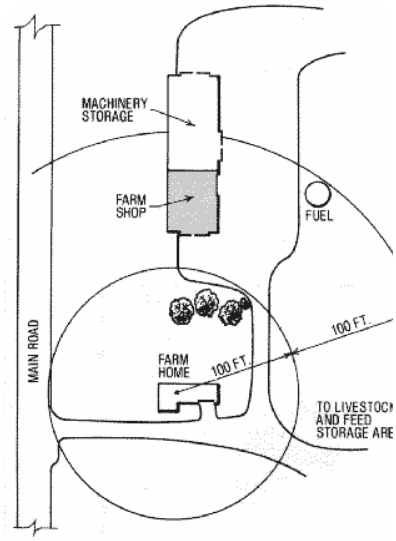


Figure 13.10 Conventional Farm

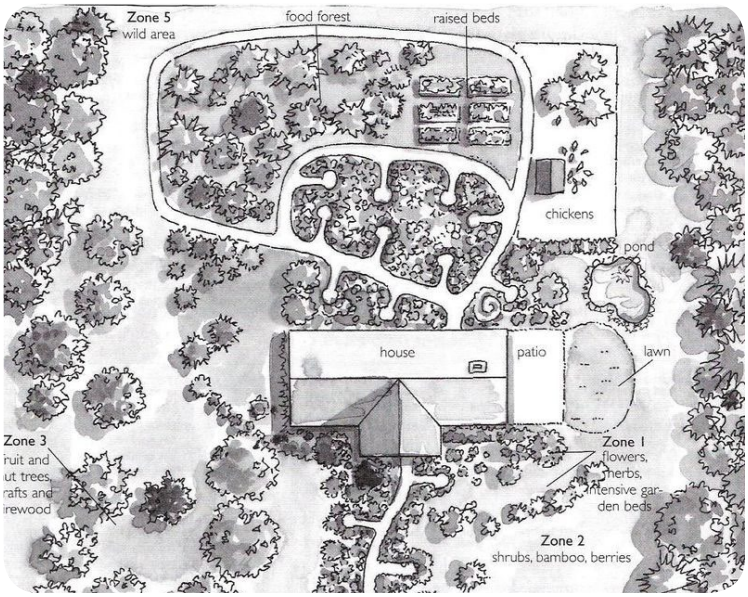


Figure 13.11 Permaculture

The integration of both conventional farming (albeit implemented in conjunction with sound environmental principles,) with permaculture begins to synthesize farming methodologies which will be most effective in managing the self-sufficient food system designed into each Bet-ave unit. The above diagrams show the spatial relationship of conventional farm infrastructure to residential unit (in our case spaced in relationship to the entire residential cluster) as well as the zoning concept inherent in permaculture design. In permaculture, zones are developed to create a synthesis of farming activities and a stratification of activities according to human demand labor conservation.

Summary of Environmental goals and objectives

Image 13.36 Trees

Goal: Preservation

Objective: Control run-off and use buffer strips on hardscapes, riparian buffers.

Habitat systems.

Image 13.37 Field

Goal: Create Environmental Edges

Objectives: Border forest, water, meadow and agriculture where possible.

Goal: Naturalize Proposed Vegetation

Objective: Utilize native plants in biologically native arrangements.

Image 13.38 Trees

Goal: Conserve water

Objective: rainwater capture and reuse, solar hot water heaters, grey water capture and reuse, living machines and run-off water treatment

Image 13.39 Landfill

Goal: Treat waste on-site

Objective: Develop waste processing facilities (living machines) and designate compost areas and additional waste integration.

Rationale: Choose locations based on gravity fed systems or on soil types that create greatest opportunity for waste integration.

Image 13.40 Water

Goal: integrate waste

Objectives: vermiculture, dry toilet, composting, soil fertility, soil food

The environmental objectives, advocated throughout the planning process with be further implemented at the site specific scale. The 'environment' is also perceived to be the source of 'environmental services' such as waste integration and water purification.

Integrated Building Landscape Systems

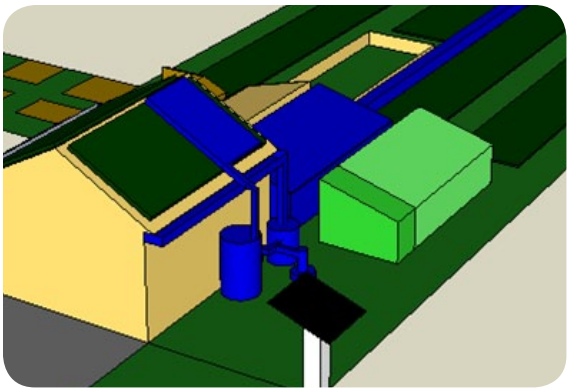


Figure 13.12 Systems Diagram

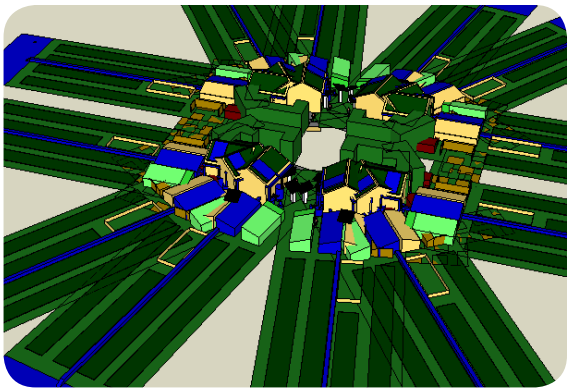


Figure 13.13 Community Diagram

Goal: Integrated built-site relationship

Objective: Maximize passive systems, generate power one site, capture water, and process waste for each architectural unit. (See energy demands in framework)

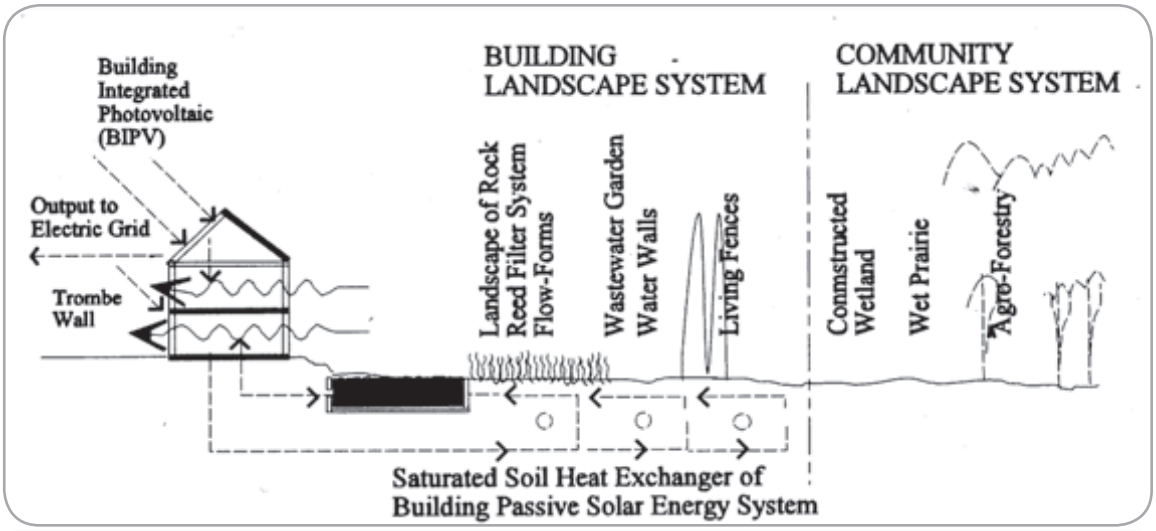


Figure 13.14 Building Landscape System Diagram

Each individual building component will aim to be an integrated building landscape system. The concept has been developed to explain the potential for integrating "environment' services" and passive energy into the human-dimension and functional requirements of human life.

LDI: Passive and Active Energy Precedent

Image 13.41 LDI Demonstration Lab

Image 13.42 LDI Demonstration Lab

Low Impact Materials

Goal: Reduce material import

Objective: Utilize the existence of on site building materials

Image 13.43-51 Materials

Passive and Active Energy

Goal: Produce net energy (for passive gains on site)
Objective: Generate energy from wind and solar energy for active systems.

Goal: Maximize Passive Energy
Objective: Develop meta-site environment to allow for direct gain and passive cooling.

Goal: Reduce heating loads
Objective : locate trees to block winter winds

Objective: orient homes and landscape feature to allow for solar gain

Goal: reduce cooling loads

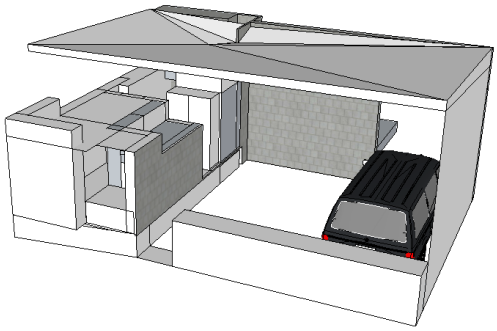
Objective: locate homes and village structures north of major water bodies

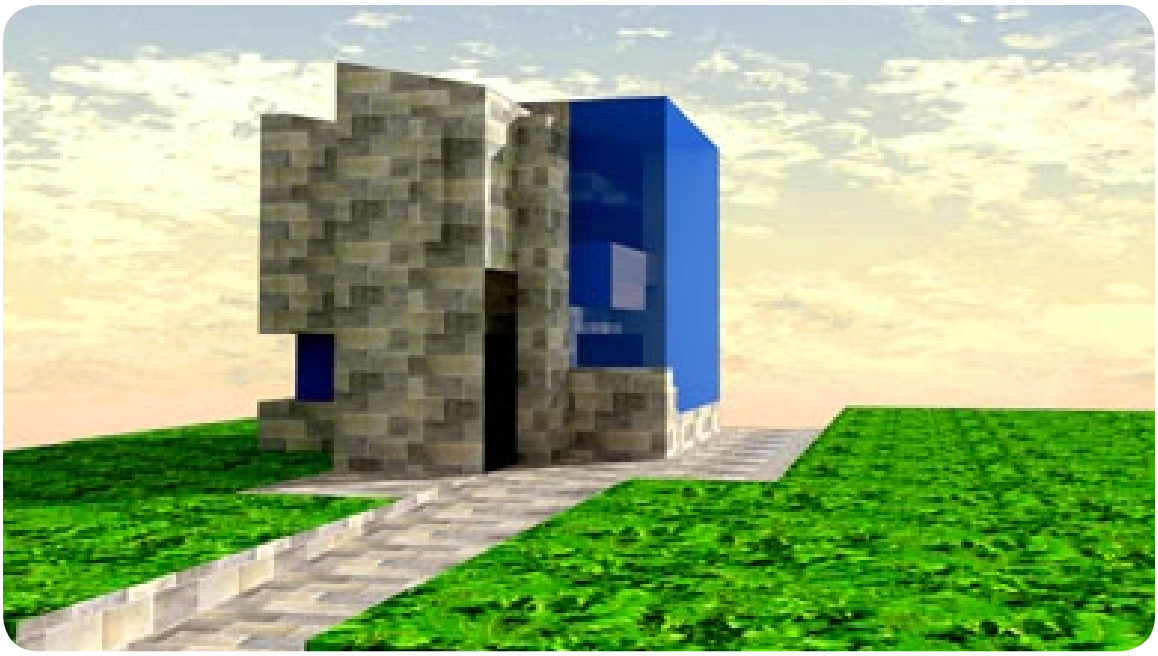
Rationale: summer winds in the Midwest flow from the south west. If water is positioned properly these winds can be cooled while traveling into the heart of the village.

Objectives: create earth massing around homes

Objectives: Shade streets and buildings with deciduous trees

Architectural Schematics





Transportation Systems within Bet-ave

Figure 13.16 Road System

Goal: Integrate road systems with the character of the village to create "place"
Objective: Make complete and livable streets that embrace vehicles yet all the same time make them safe for pedestrians.

Objective: orient streets, where possible, to permit summer winds to channel into residential areas.

Goal: Preserve existing county road system
Objective: Integrate Bet-ave access points to existing Jeffersonian grid.
Objective: Site water bodies so that they are integrated with Jeffersonian grid.

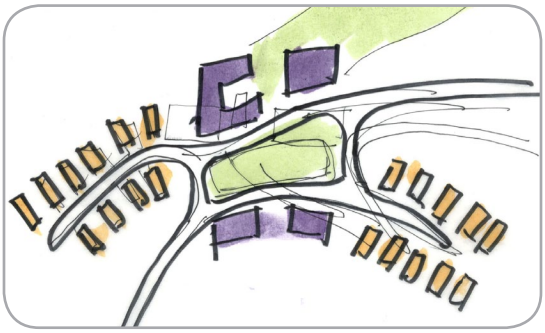
Objectives: Shade streets and buildings with deciduous trees

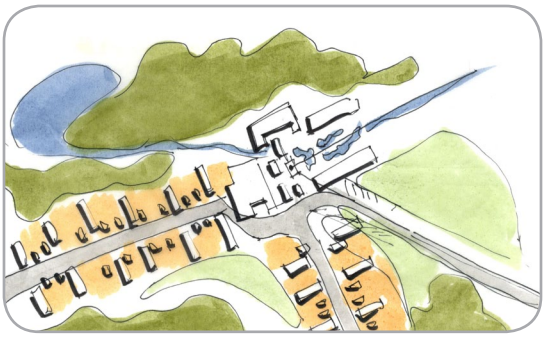
Image 13.52-55 Automobiles/Transit

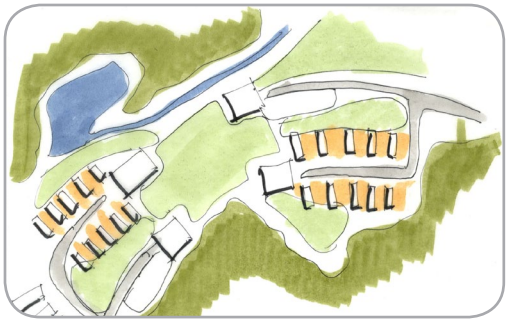
Transit systems will be developed to accommodate major modes of transportation. Each "road" or trail system will be created with the least amount of materials to accommodate the load of the particular machinery. BMP for low impact will be considered such as street/Shade trees, White roads, and Permeable pavements

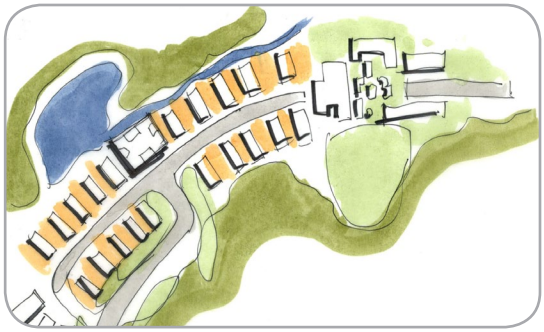
Bet-ave Site Design Schematic Alternatives

Various schematic design alternatives were explored with the intention to implement all major site design values described in the established goals and objectives. The key determinant values (which will be the criterion for selection) are: the major road system must connect to county grid; this road system must not pass through residential to reach community center; the community center must be accessible via the village greenway system without passing through residential and all site placement must exist within the boundaries defined by soil suitabilities and predetermined placement of the combined forest wetland natural system. Finally, farming infrastructure must be located away from residential areas.

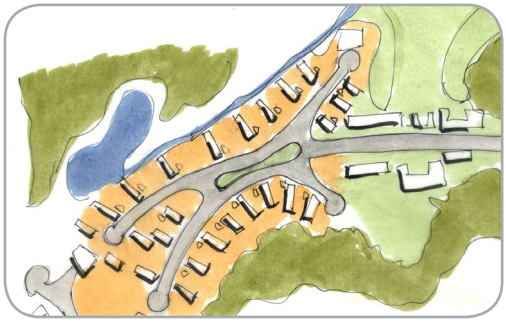








Bet-ave Site Design Schematic Alternatives



Exploring Design Alternatives

Figure 13.17 Conceptual Development

Figure 13.18 Conceptual Development

In the first alternative selected for design exploration, all of the goals and objectives were met. However, while creating a greenway connection to the Bet-ave compounds south of the site, the residential zone had to be split in order to create a path way large enough to isolate users from residential properties. This alternative was modified to prevent the residential zone from being split and the resulting plan was selected as the foundation for design proper.

Selected Design Schematic

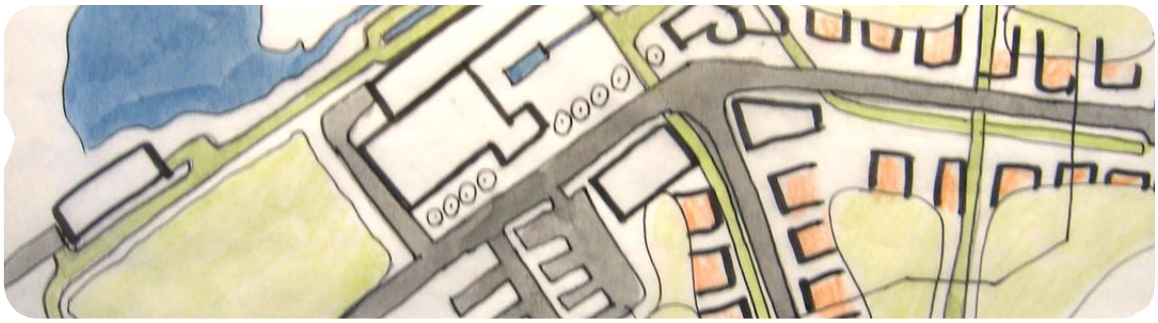


Figure 13.19 Design Development

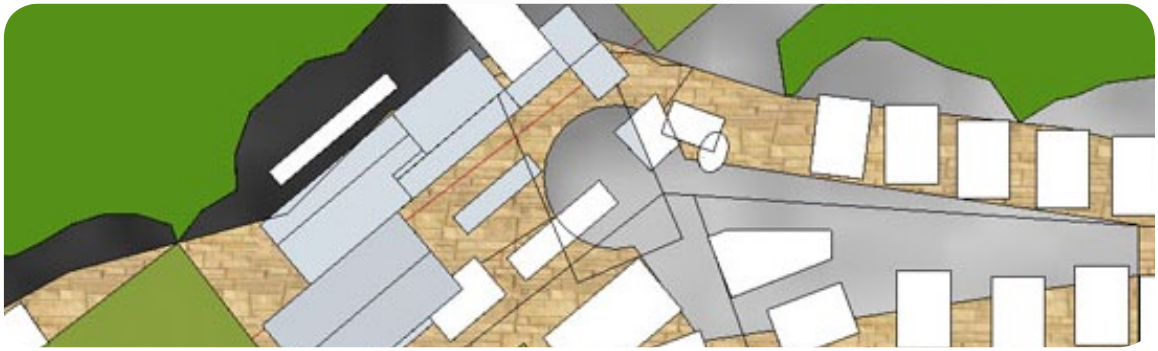


Figure 13.20 Design Development

Figure 13.21 Design Development

The design alternative selected met all stated goals and objective. The design was rendered in greater detail and then brought into a 3-D modeling program to begin establishing exact square footage for village components (established by our program) and to explore the design in three dimensions.

Site Layout Defined

Figure 13.22 Design Proposal

This conceptual model represents the manifestation of all goals and objectives as they have been stated since our initial conclusion of the Pre-Monarchic report, (delimitations of approachable design goals), their basis in physical reality, and their specific ramifications in planning and village design. The design of the north Bet-ave compound further gave us the opportunity to demonstrate how these goals and objectives can be expressed at the site design scale. The values are expressed in the land-planning process (Pre-monarchic values) as well as the physical materiality of the site. This is the basic definition of cultural-materiality, which the site design has, imbedded in its material core, an expression of culturally held and systemic values.

Whether we care to admit it or not, all human design speaks of human values. Where there is design, there are design values. Some designs are developed with greater or lesser clarity of values. In all cases designs are created to make a statement sometimes they celebrate dominant values sometimes to rail against them. Sometimes values are so abstracted they loose their meaning. The mind of the designer is responsible for value implementation in design, yet rarely does a designer have the opportunity to express his/her values unfiltered by a clients desire. Some values are clear, intentional, while other are subconscious and rooted and expressed via cultural norms.

This project had advocated the deep expression of "values" in all dimensions of the site design process. While these values, in the case of the Bet-ave, are rooted in an ancient culture, such a model of direct link between value and product should stand as a case study for all conscientious implementation of values into site design. The last chapter of this book begins to flush out in greater detail the materiality of the site and highlight key aspects and features.

PROPOSAL

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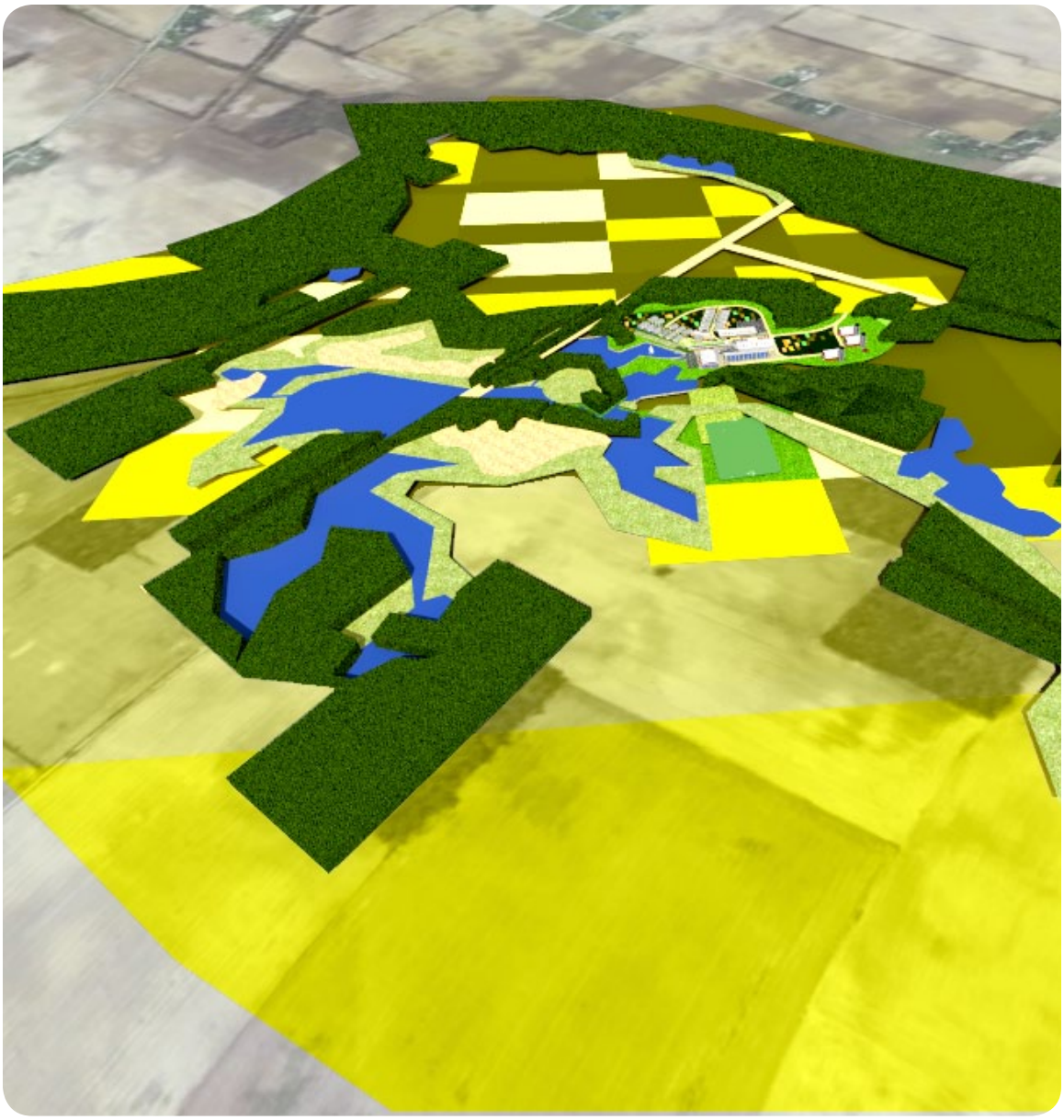

Figure 14.1 Village Master Plan

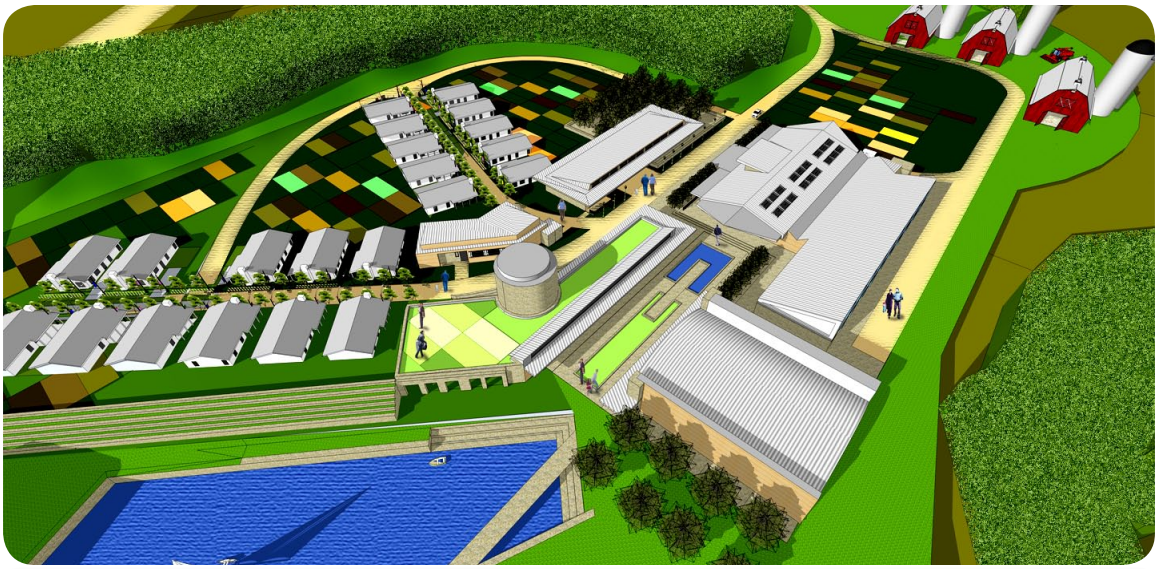

Figure 14.2 Bet-ave Site Plan

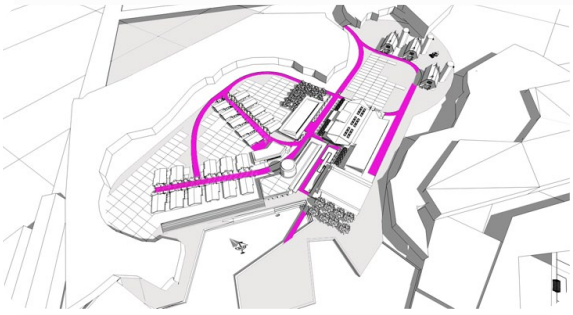

Figure 14.3 Transportation

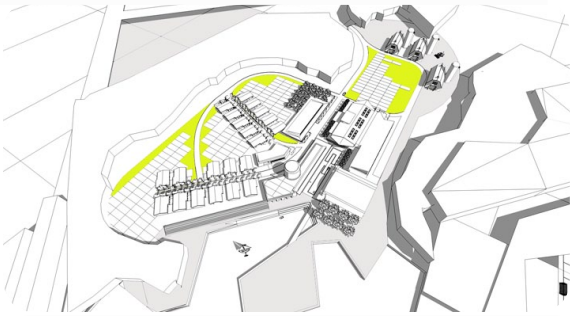

Figure 14.4 Gardens

Figure 14.5 Greenspace

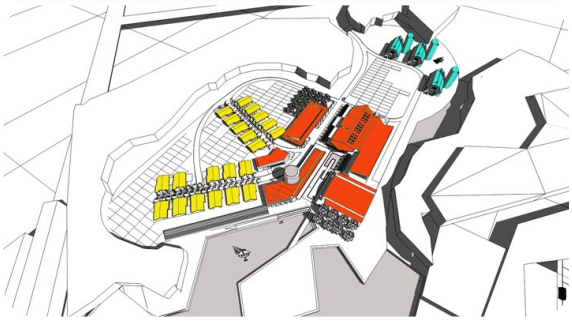

Figure 14.6 Structures

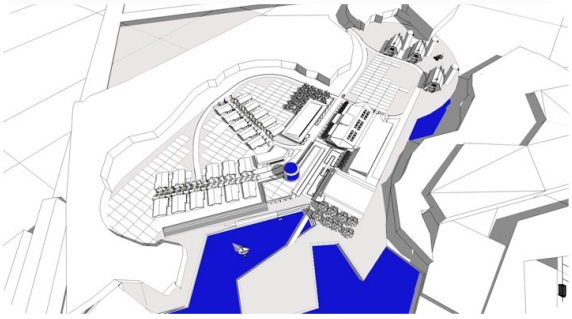

Figure 14.7 Water resources

Figure 14.8 South Perspective

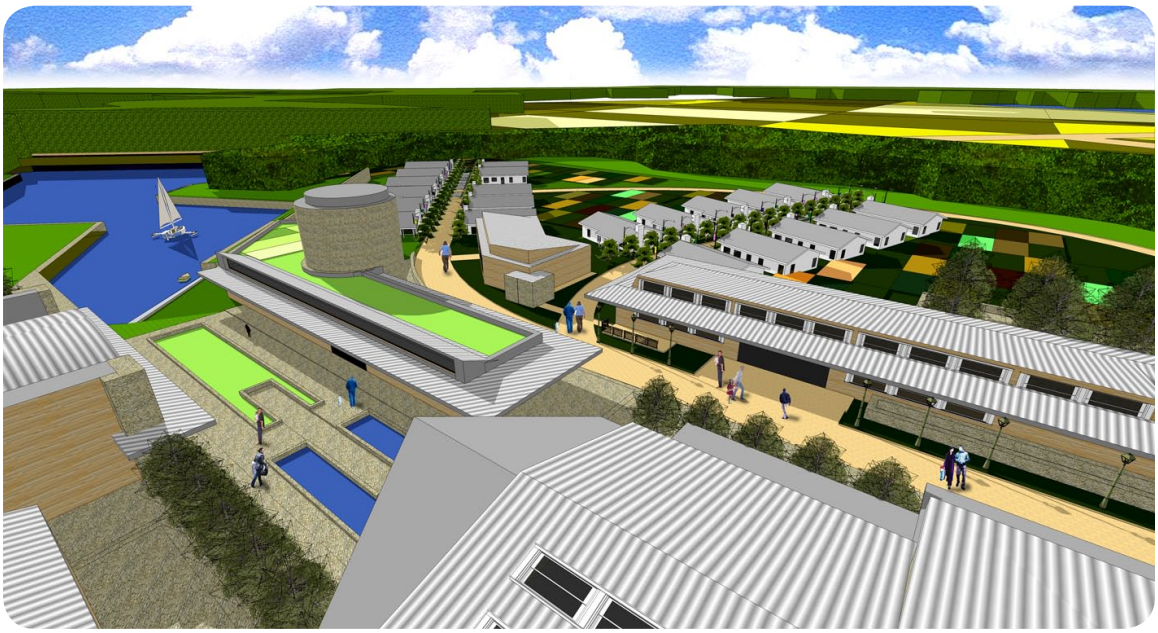

Figure 14.9 West Perspective

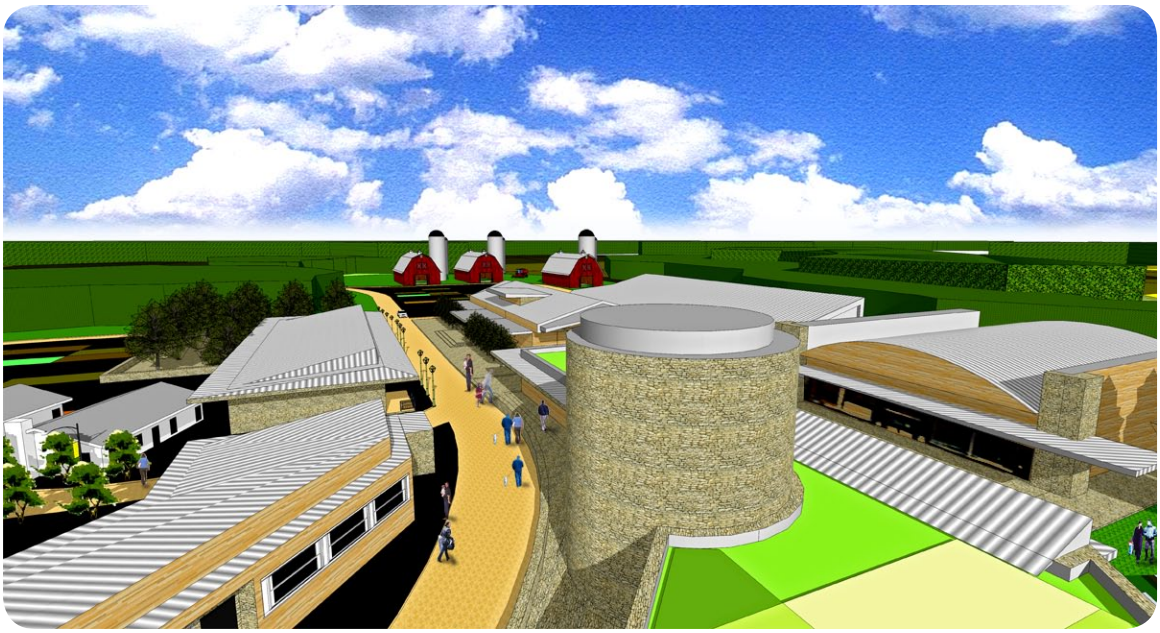

Figure 14.10 North Perspective

Figure 14.11 Bet-ave Green

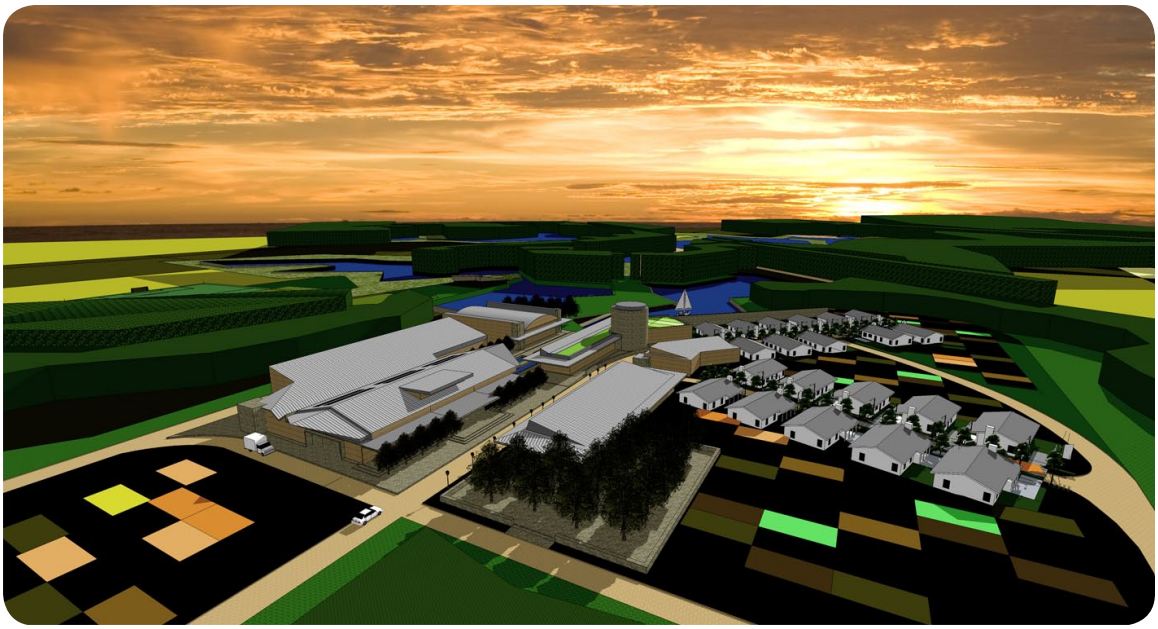

Figure 14.12 South Perspective

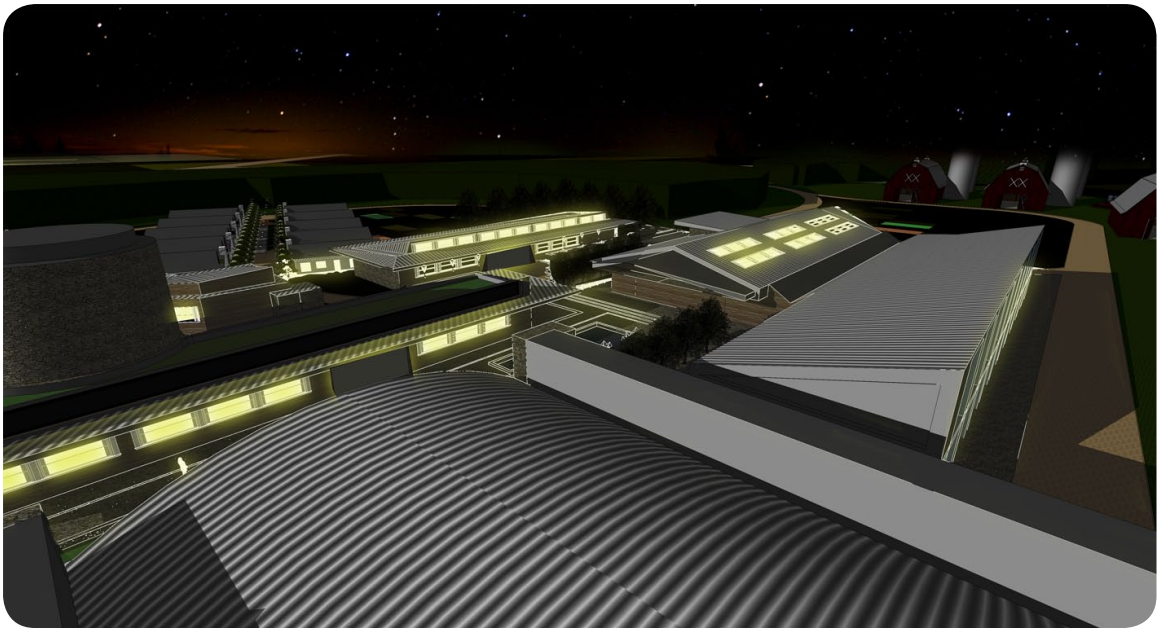

Figure 14.13 Bet-ave at night

Figure 14.14 Pedestrian transit

Figure 14.15 Pedestrian transit

Figure 14.16 Community Gardens

Figure 14.17 Bet-ave center

Figure 14.18 Bet-ave lake front

Figure 14.19 Bet-ave center

CONCLUSIONS

CONCLUSIONS

The thesis of this paper, on the one hand, is to understand and describe the socioeconomic organization on a structural level in terms of its infrastructure, policies etc., but more importantly, to understand and describe its ideological rationale. The motivations for this project are to help pre-monarchic Israel have a clearer voice in the modern discussion of the 'good society', and for designers who bring theories of social and human value and justice to their creative process. What, then, is the relevance of this particular socioeconomic system?

My assumption is that most people don't give it much thought. There is perhaps a xenophobic rationale (even in modern communities who derive their identity and inspiration from the text), but what I am identifying as at least a contributing factor, is notions of "progress" and development of human civilization, notions that put the industrial age as the ideal and inevitable apex of all human civilization and current socioeconomic models, such as global corporate capitalism, or even statist communism as supreme evolutionary advancements. This evolutionary theory of civilization is so common that it may be un-criticized or ignored by some. From such a paradigm, the Bet-ave can be so easily written off as peasant, third world, pre-industrial, deprived or inept in some respects, or even, common of some circles in the study of biblical literature, simply nothing more than the beginning phase or necessary step in the evolution of the great Israelite nation state under David and Solomon.

Although it cannot be proven in any substantial way that the state-less subsis-

tent agrarian economy is superior to all other forms of human socioeconomic organization, as such things are so highly subjective and value-driven, this literature review aims to do at least do two things: (1) To explore the pre-monarchic socioeconomic system in detail, and (2) to defend the notion that this socioeconomic system is not simply a stepping stone in the establishment of the monarchy, but the only ordained system in the Bible's value matrix. Although the creative project entails me developing tools for operating this system in modern contexts and doing a theoretical site plan, it is not my purpose to argue the bible as the supreme authority in any substantial sense, or to imply that my interpretation is somehow infallible. My hope is that by applying this analysis to modern reality and by designing a theoretical development in response, more clarity will be achieved by understanding cultural and historical precedents. Each reader can then ultimately decide the degree of relevancy for themselves.

That being said, my own sense of relevance is as follows and begins with a theory, which I have already begun to describe. The theory is that the founders of the society were intentionally and programmatically insisting on implementing a "subsistence agrarian economy built around isolated communities and extended family," and that the motivations for such a system came from deep philosophical convictions about the ideals of economics, politics, and the dignity of the human person. In order for such a theory to stand legitimately and credibly, the reader may need to resist thinking "the peasant economy was all the Hebrews 'could have done"– and be open to Israel's solution to the problem of society as something original, revolutionary and relevant. Also, we must also resist writing off the ancient experience as something with

no educational value or correlation to modern times.

I am asking the reader to be open to the idea that despite technological differences, there are tremendous similarities between the ancient near east's great nation states, and their social and economic ills with our own 21st century problems. The scope of this paper is to address these so called negative common denominators, i.e., totalitarianism, slavery, wage labor, poverty, working poor, and oppressive religion as negative contextual motivators to the development of Hebrew society. Are these forces at work in the modern age? Obviously, they are. Since they were undoubtedly at work in the ancient near east, would it be fair to say that ancient people's attempts to mitigate these ills are as valid as our own? To ignore early Israel's encounters with these forces (and again risk writing them off as ignorant or less developed) and the near eastern civilizations that used them to achieve their aims, is to close the door on an opportunity to learn from these ancients. At the least we can seek to empathize with their rationale and thinking. In fact, there is every reason to believe that the early Israelite society designed their community in response and reaction to such forces and institutions in hopes of creating a society organized along lines of human dignity and not some other objective such as efficiency or the production of surplus.

One of the great theorists of this way of thinking about early Israelite society – Norman Gottwald – would even venture to say that pre-monarchic Israel was radically revolutionary, in that its task in designing a subsistent agrarian economy was by no other rationale but value driven design -through moral fortitude - and did not just "emerge" organically or without deliberations. Perhaps it was even reactionary. The

Israelites spending years in the oppressive Egyptian system, could hardly have been ignorant of its process and reality, and if they were, how could they, ignorant of the very notion of social processes, create or even think of creating a society so different and original. Would it not make more sense that they would replicate it? Or could Moses, leader of the Israelites, presumably literate of the organization and driving motives behind the Egyptian nation state, being the pharaohs own adopted son and prince, be oblivious to its effects? To think that the Hebrews, upon their Egyptian migration could not have easily created a society based upon the exact same ordering principles of the Egyptian nation-state with Moses as their pharaoh, having the same exact qualities, is asinine. Surely they could have. Simply put, we cannot be so certain that their socio-economic decisions were not deliberate.

Thus, so far, the economical exploration of the Bet-ave: describing it in terms of a self-sufficient farm, is only part of the task and, I believe, it's most irrelevant. [Although I will continually revisit this aspect of the term and even attempt in the later developments of this creative project to model what a self-sufficient family farm might look like in modern manifestations, there are all too many examples existing today of these farms, in multiple societies and contexts (Amish, John Seymour, permaculture, peasantry etc), farms that can be easily recreated with the right amount of land, capital, and most importantly, human will power. Not to mention the role self-sufficiency plays in notions of sustainability, and obvious topic of modern discourse.] But the Bet-ave, as we have already hinted, is much more than one isolated family farm. What I believe to be more relevant is the idea of the family farm as an idealized entity in the

literature of the Torah and a successfully implemented - nation wide ideological phenomenon- in hostile circumstances, for over two hundred years in reality. My hope is that this might be relevant to anyone curious about the Bible in any sense, positive or negative. What can we learn by exploring the policies and instruments that define and defend this socioeconomic system (with its "religion" or covenant or constitutional government) against other forms of socioeconomic tendencies? What can we learn by exploring the cult and ideology that maintains the system through ritual and narratives (which preserve its integrity, celebrate it, affirm it, protect it from its known sources of its demise), and what about the peculiar notion, according to its own internal logic, that it is the only system the creator of the universe recognizes as valid (as, through their own mythology, they believe it was this creator that designed it!). As with any good-willed human concern for the greater good I believe these strategies have something to add to the tremendous task of mitigating our own social ills. To me, the theory or perspective that social ills such as totalitarianism, slavery, poverty, and oppression can be eliminated through the guarantee of the means of production to every citizen is fascinating. It is this guarantee that forms the basis of Israel's pre-monarchic system.

In other words this thesis explores the advocacy, through ideology, religion, and government of the "subsistent family agrarian business" or Bet-ave in the biblical text. My aim is to describe in detail the ideological and socioeconomic policy that institutes the self-sufficient farm (Bet-ave), and preserves it, as well as sketch its history throughout biblical literature, its degeneration and end (its abandonment by means of

establishing the Israelite monarchy). And yet, provide the evidence that even through the process of its own downfall, and through the prophets, it's remembered and idealized in their lives and teachings as Israel's only true legacy, and to the bitter end, heralded as the only system suitable to the Israelite people's commitment to God, people and the world.

RELEVANCY

The following narrative will explain why the system did not work and why we know so little about it.

Pre-monarchic Israel culture is relevant in design discussion today for two reasons: 1) Its theoretical foundations of "the good society" (social justice), and 2) its emphasis on the means of production being rooted in the household sector. The production approach, in particular, is sustainable in the most basic sense of the term: self-sustainability.

As we scramble to find modern solutions to our social and environmental problems, pre-monarchic Israel has something to contribute to the conversation. Yet, it has only been since 1979 that the anthropological method, cultural-materialism, (championed by Norman Gottwald) has been applied to biblical studies, a method of biblical scholarship that has unleashed a greater sense of the socioeconomic dynamics of this culture.

Using Pre-monarchic socioeconomic values as a program for a tangible design hopefully has demonstrated the applicability of these cultural values in the current design process, as well as created a model (albeit a modern expression of one) that

can serve as a teaching tool for biblical studies (and understanding the relationship between this culture's ideology and its built form). In both cases, the project hopes to be a demonstration of one of the many potential solutions to the contemporary social and environmental problems we face.

As mentioned, the key policies that were in place to sustain the system were not addressed in this design proposal. They simply proved to be beyond the scope of a site design project. There are many unanswered questions as to how to create legal accountability and economic feasibility in the modern context, so it is important to note that the proposal is not one that claims that this project is "an adaptive reuse or a authentic cultural recreation" – simply solving the problem of a land-footprint to consumption ratio does not recreate the socioeconomic order of pre-monarchic Israel. Other crucial factors such as social organization, and collective will identification management and implementation infrastructure is required. Most importantly, the non-coercive advocacy and sustaining force of an ideology (through religion, cult or other means) must be present in order to preserve a particular culture and the native/natural landscape which it inhabits. The religion and cult was for the Hebrews their direct government; because they were able to sustain their commitment through cult allegiance, perhaps that is why the socioeconomic order of pre-monarchic Israel lasted for as long as it did (200 years).

This order failed to continue precisely because of its inability to sustain the cultural commitment. As in all cultures, if there is not a sustained commitment to a set of values and principles the culture will change to a 'new cultural' expression.

If this project has taught us anything, it is that one cannot underestimate the role that "culture" played in the establishment of the socioeconomic order of pre-monarchic Israel. It has been mentioned that economic values, political values, and social values all fused together and mutually functioned to direct the economic order. It has also been mentioned that "religion" or "cult" was the glue that held these forces together – namely – the narrative that God had rescued the Hebrews from the destitution of the Egyptian nation state, and in return guaranteed liberty and land on the condition that they obey his commandments or run their society in "God's Way."

Hence religion and cult played a key role in the maintenance and energizing of the economic order to the degree that Norman Gottwald dubbed the religion – "the religion of socioeconomic egalitarianism." In other words, a religion/order that guaranteed the ownership of land and capital to each of its members in exchange that each preserved that decentralization through obedience of the prescribed laws and support to the systematic structures set in place to govern such a system.

This allegiance was achieved through the obedience of laws, the performance of ritual, and even the systemic redistribution of land (jubilee) to name a few. Is there a role for religion to play in organizing the amount of conviction required to create authentic and sustainable social orders from the current state of affairs?

The success of the system then depends solely on the culture, the people, and their sustained allegiance to the principals and orders – and hence, cultural sustainability is equally as relevant. But if there is no moral majority that advocates the socioeconomic order of pre monarchic Israel, it will never be implemented. Ironically, one

might wonder why America, often described as having a Christian nature, is so illiterate of the socioeconomic order of pre-monarchic Israel.

I wish to offer a brief narrative of the Hebrew socioeconomic order over the past 2000 plus years as a generic sketch and offer a theory as it is relative to the history of cultural sustainability.

The culture and religion of a 'socioeconomic egalitarianism' in present day Israel only lasted for 200 years. Political pressure from neighboring states lead to fear and an abandonment of the order in exchange for the security of a standing army (2 Samuel 8) – a decision that would ultimately destabilize the family farm and lead to a centralization of the economy and capital into the leading general (king) and eventual ruling class.

Despite its abandonment, for the next thousand years numerous counter-leaders would arise to chastise unjust rulers and call the society back to a previous time where justice was understood in light of the old covenant reveled to Moses and the Hebrew society on Mt. Sinai. In most cases this advocacy of the socioeconomic order of pre-monarchic Israel fell on deaf ears. Centuries later, some scholars argue the ethos of the Hebrew socioeconomic order had a rebirth through the life and teaching of Jesus and the early "Christian" church. Jesus spoke in the tradition of the prophets (who advocated pre-monarchic Israel socioeconomic values) and the gospel writers linked him quite frequently to Moses (calling him the fulfillment of the laws - meaning he 'walked' their ramification out). Following his death - by means of capital punishment - the church was left in the hands of Hebrew (culturally and ethnically) Apostles, namely Peter and then James, who was the brother of Jesus. The early church had cer-

tain key things in common with the pre-monarchic community and its headquarters in Israel (Hebraic). However, as the church was decentralized and spread throughout the Mediterranean /Greco-Roman world this became problematic because the Christian message was being altered to fulfill the desires of Greco-Roman culture. Greco-Roman world was Hellenist; the ideological movement of the Hellenic spirit.

Hellenization (or Hellenism) is a term used to describe the spread of ancient Greek culture, and to a lesser extent, language. It is mainly used to describe the spread of Hellenistic civilization during the Hellenistic period following the campaigns of Alexander the Great of Macedon. The result of Hellenization, elements of Greek origin combined in various forms and degrees with local elements, is known as Hellenism.

Alexander's teacher was Aristotle, and Aristotle's teacher was Plato. Aristotle taught Alexander how to run an ideal Republic which was developed by Plato. Hence, as Alexander established his rule throughout the Mediterranean he spread the culture and political order of Hellenism (Aristolte, Plato) with it.

Historically, there was always a bit of a conflict between Hellenist and Hebrews. Hellenists were thought of as 'pagans' by the Hebrews and the Hebrews were seen as illiterate 'heathens' of a lower class and uncultured by the Hellenists. Historically, the Hebrews were vehement in their resistance to any culture that dominated them to the point that it was simply more efficient for the Romans to establish a puppet state in Israel and not attempt to synchronize Yahwistic faith to the imperial cult of the Hellenists. Yet, all of the Pharisees (Israelite ruling authority) were 'Hellenized Jews.' These were hybrid-Jews who operated as mediators between the Roman political authority

and the authority of Israel. They spoke both cultural languages and synchronized many beliefs. The pharisees did not advocate the socioeconomic values of pre-monarchic Israel to the Roman empire out of fear they would lose their stature as a puppet state.

One of the Pharisees was Paul, who later became a member of the Christian community, and is largely responsible for spreading 'Jesus' message' to the Hellenic civilization. Unfortunately this was largely through the means of presenting Jesus from a Hellenist viewpoint, thus making Jesus (even the name Jesus is an Hellenistic convention: Yashua) accessible to those same Hellenists. No Hellenist was going to worship a deity from a "low class" society like that of the Jews. Because the message was delivered without the foundations of the Torah, this laid the foundation for its abandonment by the Roman church which had not desire to re-establish authentic Hebrew socioeconomic values on earth.

There was conflict between Peter and Paul over this issue of how much the church itself should lose its "Hebrewness"'(namely the influence from the Torah) and assimilate into Hellenistic culture. Peter's fear was that the very foundation of the Hebrew culture (the Torah which is the foundation of this socioeconomic study), would be abandoned.

For the most part, the church lived for 300 years in limbo regarding this core debate and somewhat in contention over it. In 300 A.D., the church in Rome managed to covert the emperor of the Roman Empire to Christianity. The emperor Constantine made Christianity, as understood by the Roman churches, the state religion. At this point, Constantine also assumed leadership of the church, an inflammatory act to the

'headquarters' in Israel. Constantine had no interest in incorporating the Old Testament socioeconomic policies into the Roman empire. Constantine held the Council of Nicea in which he dogmatized the church and set 'creeds' which were statements that the church believed and once and for all put an end to the Hebrew vs. Hellenism debate. This ended the chance that Hebrew socioeconomic values, now referred to as the "old covenant" would be adopted by the Roman empire. People at the council of Nicea, who advocated a more Hebrew culture centered Christianity, were marginalized and labeled Juadizers.

> *"Judaizers refers to those who claim the necessity of obedience to the Torah Laws by Christians, which is normally considered a requisite only for the followers of Judaism. Similarly, "one who has Judaized" refers to a Christian who has accepted the necessity of adhering to the Torah Laws, see also Biblical law in Christianity. The ongoing debate over Judaizing in Christianity, which began in the lifetime of the apostles, reflects the contemporaneous debate within Judaism as to the place of Gentiles with regard to the Law of Moses. (see also Proselyte, Noahide Law, Jewish background to the early Christian circumcision controversy, and Dual-covenant theology.)" (Wikipedia)*

The central debate in the Hebrew/Hellenistic discussion is the role of the book of Moses/laws of Moses. This book contained the laws for the socioeconomic order of pre monarchic Israel. These laws are seen as mandatory by the 'Jerusalem' church and were seen as a discarded 'old covenant' by the Hellenists. The key crucial issues in the laws of Moses are not the dietary laws, the circumcision issues, the feasts and the other religious/sacrificial based laws, but the basis of the Mosaic law: socioeconomics.

As mentioned, the Hellenists already had a socioeconomic order they consid-

ered 'divine', i.e., the republic outlined by Plato/Socrates. In the book of Moses was an alternative socioeconomic order called a 'tribal federation' – whose Bet-ave is the focus of this thesis. This tribal federation is demanded by the groups sole 'king' / and 'sovereign' god. There are great differences and great ramifications of those differences between Plato's republic and the society god outlines and demands in the book of Moses, revealed by god. As mentioned, when Constantine became ruler of the church he put his stamp of approval on the 'republic' - after all - he was the emperor of the republican empire! Simply put, when the Hellenists purged the Torah of its relevancy, they purged its authority on the lives of the nation state and its new Christian subjects.

The Catholic and Orthodox churches continued this tradition, and great and famous treatises have been written on the glory of Hellenism and of the Republican culture. (See Thomas Aquinas and Augustine of Hippo). The Catholic Church so approved of these leaders that they sanctified them.

In terms of cultural relevancy, this quick sketch of Hebrews history in the western world explains why, despite having the "bible" as a foundational American document and piece of national literature, very little is known about the pre-monarchic era.

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11.11 – 11.14 - materials

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11.15 - bull dozer

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11.16 - landfill

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11.17 - worms

"worms." Photo. wordpress.com 21 FEB. 2010. <http://pastoraaronrobb.files.wordpress.com/2009/03/worm1.jpg>.

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12.2 – 12.3 - wind and solar

(c) FreeFoto.com

12.4 – 12.6 - trees, creek, lily pads

(c) FreeFoto.com

12.7 – 12. 8 - people, trees

(c) FreeFoto.com

12.9 - st. james park

st james park." Photo. www.pps.org 21 FEB. 2010. <http://www.pps.org/graphics/gpp/st_james_park_2_xlarge>.

12.10 - streams

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13.39 - landfill

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13.41 – 13.42 - land design institute

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13.52 – 13.55 - transit

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APPENDIX

APPENDIX

Existing Conditions, bet-ave inventory

	forest (acres)	omesteads	ater (acres)	omesteads	nents/area	"land"	omesteads	bet-aves	bet-aves	population	acres	sq ft	
	23.12	3.30	0.00	0.00		93.23	7.77	0.39	0.17	16.51	16.51	719376.3	
1	65.90	9.41	0.00	0.00		766.39	63.87	3.19	0.47	47.07	47.07	2050389.1	
2	55.81	7.97	4.05	6.14	6.14	490.78	40.90	2.04	0.40	39.87	39.87	1736595.1	
3	0.00	0.00	0.00	0.00		97.03	8.09	0.40	0.00	0.00	0.00	0.0	
4	28.94	4.13	0.00	0.00		315.49	26.29	1.31	0.21	20.67	20.67	900326.7	
5	30.38	4.34	0.00	0.00		639.17	53.26	2.66	0.22	21.70	21.70	945131.5	
6	63.80	9.11	2.21	3.35	3.35	888.97	74.08	3.70	0.46	45.57	45.57	1985151.0	
7	0.00	0.00	4.75	7.20		350.53	29.21	1.46	0.00	0.00	0.00	0.0	
8	0.00	0.00	0.00	0.00		143.16	11.93	0.60	0.00	0.00	0.00	0.0	
9	26.51	3.79	1.70	2.57	2.57	647.23	53.94	2.70	0.19	18.94	18.94	824818.6	
10	0.00	0.00	10.70	16.21		640.99	53.42	2.67	0.00	0.00	0.00	0.0	
11	0.00	0.00	0.00	0.00		326.51	27.21	1.36	0.00	0.00	0.00	0.0	
12	12.09	1.73	0.00	0.00		378.22	31.52	1.58	0.09	8.63	8.63	376053.4	
13	44.83	6.40	0.85	1.29	1.29	624.01	52.00	2.60	0.32	32.02	32.02	1394705.7	
14	34.76	4.97	8.63	13.07	4.97	372.95	31.08	1.55	0.25	24.83	24.83	1081647.6	
15	10.12	1.45	0.00	0.00		533.16	44.43	2.22	0.07	7.23	7.23	314771.7	
16	20.76	2.97	0.00	0.00		646.38	53.87	2.69	0.15	14.83	14.83	645951.5	
17	27.53	3.93	27.79	42.11	3.93	997.77	83.15	4.16	0.20	19.66	19.66	856496.1	
18	35.81	5.12	0.00	0.00		507.70	42.31	2.12	0.26	25.58	25.58	1114349.2	
19	43.86	6.27	2.32	3.51	3.51	632.41	52.70	2.64	0.31	31.33	31.33	1364707.3	
20	0.00	0.00	0.00	0.00		305.40	25.45	1.27	0.00	0.00	0.00	0.0	
21													

total homesteads	total home	**total**
74.89	95.45	25.76
total bet-ave	total bet-ave	
3.74	4.77	

APPENDIX

Ideal Conditions, bet-ave inventory

	total area Feet ²	acres	total theory units	population	bet-av's	forests	agricultural land
1	4,061,078.80	93.23	7.77	38.85	0.39	54.38	38.85
2	33,384,128.00	766.39	63.87	319.33	3.19	447.06	319.33
3	21,378,336.11	490.78	40.90	204.49	2.04	286.29	204.49
4	4,226,814.35	97.03	8.09	40.43	0.40	56.60	40.43
5	13,742,934.47	315.49	26.29	131.46	1.31	184.04	131.46
6	27,842,437.40	639.17	53.26	266.32	2.66	372.85	266.32
7	38,723,674.58	888.97	74.08	370.41	3.70	518.57	370.41
8	15,269,134.26	350.53	29.21	146.05	1.46	204.48	146.05
9	6,236,229.34	143.16	11.93	59.65	0.60	83.51	59.65
10	28,193,128.38	647.23	53.94	269.68	2.70	377.55	269.68
11	27,921,467.01	640.99	53.42	267.08	2.67	373.91	267.08
12	14,222,899.34	326.51	27.21	136.05	1.36	190.47	136.05
13	16,475,334.59	378.22	31.52	157.59	1.58	220.63	157.59
14	27,181,845.13	624.01	52.00	260.00	2.60	364.01	260.00
15	16,245,786.81	372.95	31.08	155.40	1.55	217.56	155.40
16	23,224,486.17	533.16	44.43	222.15	2.22	311.01	222.15
17	28,156,335.16	646.38	53.87	269.33	2.69	377.06	269.33
18	43,462,835.33	997.77	83.15	415.74	4.16	582.03	415.74
19	22,115,597.11	507.70	42.31	211.54	2.12	296.16	211.54
20	27,547,847.07	632.41	52.70	263.50	2.64	368.91	263.50
21	13,303,323.56	305.40	25.45	127.25	1.27	178.15	127.25

	total	total	total	total	total	total	total
	448,854,574.16	10,397.51	866.46	4,332.30	43.32	6,065.22	4,332.30
			571.8631982				

	forest sq ft	sqrt
	2368962.634	1539.143474
	19474074.67	4412.943991
	12470696.06	3531.387272
	2465641.702	1570.236193
	8016711.773	2831.379836
	16241421.81	4030.064741
	22588810.17	4752.768685
	8906994.987	2984.45891
	3637800.449	1907.301877
	16445991.55	4055.365773
	16287522.42	4035.780274
	8296691.281	2880.397764
	9610611.847	3100.098683
	15856076.33	3981.968901
	9476708.974	3078.42638
	13547616.93	3680.708754
	16424528.85	4052.718698
	25353320.61	5035.2081
	12900764.98	3591.763492
	16069577.46	4008.687747
	7760272.077	2785.72649

	total	total
	264200797.6	16254.25475

	homestead sq ft	sqrt
	1692116.167	1300.813656
	13910053.33	3729.61839
	8907640.045	2984.566978
	1761172.644	1327.091799
	5726222.695	2392.952715
	11601015.58	3406.026362
	16134864.41	4016.822676
	6362139.276	2522.328146
	2598428.892	1611.964296
	11747136.82	3427.409637
	11633944.59	3410.85687
	5926208.058	2434.380426
	6864722.748	2620.061592
	11325768.8	3365.377959
	6769077.839	2601.745153
	9676869.237	3110.766664
	11731806.32	3425.172451
	18109514.72	4255.527549
	9214832.129	3035.594197
	11478269.61	3387.959506
	5543051.483	2354.368595

	total	total
	188714855.4	13737.35256

	total area Feet ²	acres	total theory family units	population	green space	ft2	sqrt	forests	ft2	sqrt	agricultural land	ft2	sqrt	water	ft2	sqrt
1	4,061,078.80	93.23	7.67	38.37	1.15	50,136.78	223.91	53.71	2,339,716.18	1529.61	38.37	1,671,225.84	1292.76	5.06		
2	33,384,128.00	766.39	63.08	315.39	9.46	412,149.73	641.99	441.54	19,233,653.99	4385.62	315.39	13,738,324.28	3706.52	41.63		
3	21,378,336.11	490.78	40.39	201.97	6.06	263,930.08	513.74	282.75	12,316,736.85	3509.52	201.97	8,797,669.18	2966.09	26.66		
4	4,226,814.35	97.03	7.99	39.93	1.20	52,182.89	228.44	55.90	2,435,201.68	1560.51	39.93	1,739,429.77	1318.87	5.27		
5	13,742,934.47	315.49	25.97	129.83	3.89	169,665.86	411.91	181.77	7,917,740.02	2813.85	129.83	5,655,528.59	2378.14	17.14		
6	27,842,437.40	639.17	52.61	263.03	7.89	343,733.80	586.29	368.25	16,040,910.43	4005.11	263.03	11,457,793.17	3384.94	34.72		256
7	38,723,674.58	888.97	73.17	365.83	10.97	478,070.06	691.43	512.17	22,309,935.97	4723.34	365.83	15,935,668.55	3991.95	48.29		93.49
8	15,269,134.26	350.53	28.85	144.25	4.33	188,507.83	434.17	201.95	8,797,032.09	2965.98	144.25	6,283,594.35	2506.71	19.04		
9	6,236,229.34	143.16	11.78	58.92	1.77	76,990.49	277.47	82.48	3,592,889.33	1895.49	58.92	2,566,349.52	1601.98	7.78		
10	28,193,128.38	647.23	53.27	266.35	7.99	348,063.31	589.97	372.89	16,242,954.62	4030.25	266.35	11,602,110.44	3406.19	35.16		
11	27,921,467.01	640.99	52.76	263.78	7.91	344,709.47	587.12	369.29	16,086,441.90	4010.79	263.78	11,490,315.64	3389.74	34.82		
12	14,222,899.34	326.51	26.87	134.37	4.03	175,591.35	419.04	188.11	8,194,262.99	2862.56	134.37	5,853,045.00	2419.31	17.74		
13	16,475,334.59	378.22	31.13	155.65	4.67	203,399.19	451.00	217.91	9,491,962.32	3080.90	155.65	6,779,973.08	2603.84	20.55		
14	27,181,845.13	624.01	51.36	256.79	7.70	335,578.33	579.29	359.51	15,660,322.30	3957.31	256.79	11,185,944.50	3344.54	33.90		
15	16,245,786.81	372.95	30.70	153.48	4.60	200,565.27	447.85	214.87	9,359,712.57	3059.36	153.48	6,685,508.98	2585.64	20.26		
16	23,224,486.17	533.16	43.88	219.41	6.58	286,722.05	535.46	307.17	13,380,362.40	3657.92	219.41	9,557,401.72	3091.50	28.96		
17	28,156,335.16	646.38	53.20	266.00	7.98	347,609.08	589.58	372.40	16,221,756.88	4027.62	266.00	11,586,969.20	3403.96	35.11		
18	43,462,835.33	997.77	82.12	410.60	12.32	536,578.21	732.51	574.85	25,040,316.65	5004.03	410.60	17,885,940.47	4229.18	54.20		
19	22,115,597.11	507.70	41.79	208.93	6.27	273,032.06	522.52	292.50	12,741,496.28	3569.52	208.93	9,101,068.77	3016.80	27.58		
20	27,547,847.07	632.41	52.05	260.25	7.81	340,096.88	583.18	364.35	15,871,187.61	3983.87	260.25	11,336,562.58	3366.98	34.35		
21	13,303,323.56	305.40	25.14	125.68	3.77	164,238.56	405.26	175.95	7,664,466.25	2768.48	125.68	5,474,618.75	2339.79	16.59		

	total	**total**	**total**	**total**	**total greenspace**			**total forest**			**total ag**			total water	
	448,854,574.16	10,397.51	855.76	4,278.81	128.36	5,591,551.27	10,452.13	5,990.34	260,939,059.32	71,401.66	4,278.81	186,385,042.37	60,345.42	564.80	
		total acres													
		266622861.90													

VEGTABLE GARDEN

garden needs to be above crops only

GARDEN SITE DIMNESIONS	GREY WATER: DISTRIBUTION	EXCESS RAIN WATER	WATERING : IN / MONTH		
3049200	337500		4		
Water From Rain in Gallons	*Grey water in gallons*	*Water from roof in gallons*	*Water Needs in Gallons*	*water needs from other sources*	*Winter Rainwater collection*
0.00	337500	0.00	0	0	329031.25
0.00	337500	0.00	0	0	Pond Aviliable Per Year
0.00	337500	0.00	0	0	31,715,151
0.00	337500	0.00	0	0	32,044,182
660128.93	337500	222843.75	7623000	6402527.32	25641654.55
677542.40	337500	776804.69	7623000	5831152.91	19810501.64
630051.11	337500	197312.50	7623000	6458136.39	13352365.26
552482.01	337500	131468.75	7623000	6601549.24	6750816.01
471746.81	337500	62937.50	7623000	6750815.69	0.33
0.00	337500	0.00	0	0	
0.00	337500	0.00	0	0	
0.00	337500	0.00	0	0	
2991951.27	4050000	1391367.19	38115000	**32,044,181.54**	
	Greywater to Core Garden				**tank size**
Percentage of Core Acre	1687500				32044181.87
7000.00%					
	Greywater not to garden				
	2362500				
	grey water per day per winter				
	10,887.10				

INDOOR CONSTRUCTED WETLAND

greywater per day
6472.60
displacement of plants and gravel
0.3
capacity needs
8,414.38

purified water per year
2362500.00

Greywater pond depth
2
pond apature
565
capacity gallons at current depth
8452.40

days in wetland
3
size of wetland apature
1695
capacity in gallons
25357.20

BAMBOO FIELD

number of gallons to bamboo field per day
6472.60274

ALGEA POND in this model is being bypassed

	SIZE OF ALGEA POND	**Rainwater addition**
TOTAL YEARLY IMPUT	Depth	86,040.17
26,450.00	1	**rainwater after evaporation**
	Apature	51,624.10
	3536.2	**amount siphoned to pond**
	capacity in gallons	51,624.10
	26,450.78	

ALGEA POND FUEL USAGE

AMOUNT OF BIO FUEL CREATED/YR
1,058.00
AMOUNT OF BIO FUEL NEEDED TO POWER HOUSE
321.51
LEFT OVER AMOUNT OF FUEL FOR VEHICES
736.49
estimated vehicle usage
558.44

LEFT OVER BIO FUEL
178.04

POND SIZING

POND APATURE		EVAPORATION	POND FLOW INPUTS
2247423		0.4	***rainwater/grey water***
	if no algea pond		
Water hitting pond in gallons	*grey water via wetland*		
2893557.11	0	1157422.85	1736134.27
3160438.59	0	1264175.44	1896263.16
4354382.06	0	1741752.83	2612629.24
5056701.75	0	2022680.70	3034021.05
5857346.19		2342938.48	3514407.72
6011856.53		2404742.61	3607113.92
5590464.71		2236185.89	3354278.83
4902191.42		1960876.57	2941314.85
4185825.34		1674330.14	2511495.20
3680155.16	0	1472062.07	2208093.10
4747681.09	0	1899072.44	2848608.65
4242010.91	0	1696804.37	2545206.55
54682610.87			
Apature Rainwater to Pond	*greywater to pond*	*total apature evaporation*	average monthly imput
54682610.87	0.00	21,873,044	2734130.543
			total yearly imput
			32,809,566.52
			total yearly imput from algea pond overflow
			51,624.10
			total rainwater to pond
			32,861,191

YEARLY POND FLOW

yearly imput from rain and greywater
32861190.62
yearly household needs
0 -1720398.438
yearly livestock needs
1146040 1 cow, 15 birds
balance/avaliable from rain
31,715,151 1 months drought

APATURE NEEDED TO COLLECT REPLENISHED RAINWAYTER
(please also consider overflow of apature from algea pond)
how big your apature is depends on how much rainwater you collect
the more additional functions, the bigger the apature
2247423 1499.140754

POND DEPTH FOR RAMMED EARTH STRUCTURE OR MINIMUM
14
holding capacity needed
32,861,190.62 (pond may need to be deeper)
capacity at current depth **talapia**
235,350,136.56 tons per acre (43560)
balance 2.2
7.161947943 113.5062121
balance in gallons
31,715,151 pounds per acre
227012.4242

Gas Flow (this heating takes place in a building with an unknown total R-value)

CCG-2008

	CCF	Therms	BTUs	KWH
Month				
Jan	108	110.7	11,070,000.00	3,244.30
Feb	110	112.75	11,275,000.00	3,304.38
Mar	76	77.9	7,790,000.00	2,283.02
Apr	44	45.1	4,510,000.00	1,321.75
May	7	7.175	717,500.00	210.28
Jun	0	0	0.00	0.00
Jul	1	1.025	102,500.00	30.04
Aug	0	0	0.00	0.00
Sep	0	0	0.00	0.00
Oct	0	0	0.00	0.00
Nov	29	29.725	2,972,500.00	871.15
Dec	61	62.525	6,252,500.00	1,832.43
Annual	436	446.9	44,690,000.00	13,097.35

Electricity Flow

Month	KWH	BTUs	KWH
Jan	718	2,449,917.69	718
Feb	731	2,494,275.54	731
Mar	565	1,927,860.02	565
Apr	518	1,767,489.37	518
May	478	1,631,003.70	478
Jun	411	1,402,390.21	411
Jul	702	2,395,323.43	702
Aug	871	2,971,975.36	871
Sep	624	2,129,176.38	624
Oct	521	1,777,725.79	521
Nov	416	1,419,450.92	416
Dec	675	2,303,195.60	675
Annual	7230	24,669,784.02	7230

House		
1350	**GAS + ELECTRICITY**	**GAS + ELECTRICITY**
BARN	69,359,784.02	20,327.35
464		
total		
1814		

ADDITIONAL FUEL

TRACTOR	**2 SMART CARS**
40 hours of gas per acre	per year
at 5 acres	13,520
200 hours of gal	MPG
deisel = 1.29 gal/hr	45
GALLONS PER YEAR	**GALLONS PER YEAR**
258	300.44
BTU	BTU
35862000	41761777.78
KWH	KWH
10510.11471	12239.1689

Let's assume the 'average' person drives 20 miles round trip to work each week, and another 30 miles for errands, etc.
130 miles (avg) per week.

BTU		KWH	
gas heating	44,690,000.00	**gas heating**	13,097.35
electricity	24,669,784.02	**electricity**	7230
engines	77623777.78	**engines**	22749.28361
GAS + ELECTRICITY + TRANSIT	146,983,561.80	**GAS + ELECTRICITY+TRANSIT**	43,076.63

GENERATION

FOREST	**BIOFULES**	**PHOTOVOTALIC**	**WIND GENERATORS**
1 acre woods produces btu	**1 gallon of biofuel= x btu**	KWH/day	KWH/day
7,000,000	139,000	80.59	80.59
acres needed /btu consuption per year			KWH/year
6.38	**btu's per year**	**insolation hours**	43,076.63
	44,690,000.00	6	
	average gallons per year	**KW**	Jacobs 31-20

RAIN WATER COLLECTION

		WATER FROM ROOF	TOTAL WATER NEEDS	WATER NEEDS AFTER RAINWATER	% NEEDS MEET	AVIALABLE WATER TO GARDENS	RAINWATER TANK FLOW
RAINFALL		215000	337500			4000	year one
		METAL ROOF DIMENSIONS					*Starting gallons*
Month	feet	*Water in Gallons*	*Water in Gallons*	*Water in Gallons*	*% WATER NEEDS MEET*	*Water in Gallons*	0
Jan	0.171666667	276,812.50	337500	60687.5	82.0%	-60687.5	-60687.5
Feb	0.1875	302,343.75	337500	35156.25	89.6%	-35156.25	-95843.75
Mar	0.258333333	416,562.50	337500	-79062.5	123.4%	79062.5	-16781.25
Apr	0.3	483,750.00	337500	-146250	143.3%	146250	129468.75
May	0.3475	560,343.75	337500	-222843.75	166.0%	222843.75	352312.5
Jun	0.356666667	1,114,304.69	337500	-776804.6875	330.2%	776804.6875	1129117.188
Jul	0.331666667	534,812.50	337500	-197312.5	158.5%	197312.5	1326429.688
Aug	0.290833333	468,968.75	337500	-131468.75	139.0%	131468.75	1457898.438
Sep	0.248333333	400,437.50	337500	-62937.5	118.6%	62937.5	1520835.938
Oct	0.218333333	352,062.50	337500	-14562.5	104.3%	14562.5	1535398.438
Nov	0.281666667	454,187.50	337500	-116687.5	134.6%	116687.5	1652085.938
Dec	0.251666667	405,812.50	337500	-68312.5	120.2%	68312.5	1720398.438
Annual	3.24	5,770,398.44	4050000	-1720398.438	142.5%	1720398.438	

				net needs after rainwater		water to greywater/raingarden	*net gain*
				-1720398.438		3440796.875	1720398.438
						April Amount april	
						329031.25	-3892882.813

APPENDIX

Existing conditions: Suitability determined by existing forests

dependant on forest	forest Feet ²	acres	water		homesteads	bet-aves	population	homestead footprint acres	sq ft	sqrt	
1		1007126.89	23.12			3.30	0.17	16.51	16.51	719376.35	848.16
2		2870544.81	65.90			9.41	0.47	47.07	47.07	2050389.15	1431.92
3		2431233.18	55.81	176612.51	4.05	7.97	0.40	39.87	39.87	1736595.13	1317.80
4							0.00	0.00	0.00	0.00	0.00
5		1260457.44	28.94			4.13	0.21	20.67	20.67	900326.75	948.86
6		1323184.16	30.38			4.34	0.22	21.70	21.70	945131.54	972.18
7		2779211.42	63.80	96242.50	2.21	9.11	0.46	45.57	45.57	1985151.01	1408.95
8				207059.05	4.75	0.00	0.00	0.00	0.00	0.00	0.00
9						0.00	0.00	0.00	0.00	0.00	0.00
10		1154746.10	26.51	73952.03	1.70	3.79	0.19	18.94	18.94	824818.64	908.20
11				466007.32	10.70	0.00	0.00	0.00	0.00	0.00	0.00
12						0.00	0.00	0.00	0.00	0.00	0.00
13		526474.88	12.09			1.73	0.09	8.63	8.63	376053.49	613.23
14		1952587.98	44.83	37207.00	0.85	6.40	0.32	32.02	32.02	1394705.70	1180.98
15		1514306.75	34.76	375787.47	8.63	4.97	0.25	24.83	24.83	1081647.68	1040.02
16		440680.38	10.12			1.45	0.07	7.23	7.23	314771.70	561.05
17		904332.16	20.76			2.97	0.15	14.83	14.83	645951.54	803.71
18		1199094.65	27.53	1210519.13	27.79	3.93	0.20	19.66	19.66	856496.18	925.47
19		1560088.96	35.81			5.12	0.26	25.58	25.58	1114349.26	1055.63
20		1910590.28	43.86	100891.55	2.32	6.27	0.31	31.33	31.33	1364707.34	1168.21
21						0.00	0.00	0.00	0.00	0.00	0.00
											15184.35
	total		total		total	total	total	total	total	total	
		22834660.03	524.21	2744278.56	63.00	74.89	3.74	374.44	374.44	16310471.45	4038.62

APPENDIX

Existing conditions: Suitability determined by existing water

dependant on water

	forest Feet ²	acres	water	acres	homesteads	bet-aves	population	acres	homestead footprint sq ft
1		1007126.89	23.12			0.00	0.00	0.00	0.00
2		2870544.81	65.90			0.00	0.00	0.00	0.00
3		2431233.18	55.81	176612.51	4.05	6.14	0.31	30.72	30.72
4						0.00	0.00	0.00	0.00
5		1260457.44	28.94			0.00	0.00	0.00	0.00
6		1323184.16	30.38			0.00	0.00	0.00	0.00
7		2779211.42	63.80	96242.50	2.21	3.35	0.17	16.74	16.74
8				207059.05	4.75	7.20	0.36	36.01	36.01
9						0.00	0.00	0.00	0.00
10		1154746.10	26.51	73952.03	1.70	2.57	0.13	12.86	12.86
11				466007.32	10.70	16.21	0.81	81.05	81.05
12						0.00	0.00	0.00	0.00
13		526474.88	12.09			0.00	0.00	0.00	0.00
14		1952587.98	44.83	37207.00	0.85	1.29	0.06	6.47	6.47
15		1514306.75	34.76	375787.47	8.63	13.07	0.65	65.36	65.36
16		440680.38	10.12			0.00	0.00	0.00	0.00
17		904332.16	20.76			0.00	0.00	0.00	0.00
18		1199094.65	27.53	1210519.13	27.79	42.11	2.11	210.53	210.53
19		1560088.96	35.81			0.00	0.00	0.00	0.00
20		1910590.28	43.86	100891.55	2.32	3.51	0.18	17.55	17.55
21						0.00	0.00	0.00	0.00
	total	total	total		total total		total	total	total
		22834660.03	524.21	2744278.56	63.00	95.45	4.77	477.27	477.27

APPENDIX

Existing conditions: Suitability determined by existing water and forest

forest/water

	forest Feet ²	acres		homesteads	water	acres		homesteads		rank	bet-aves	population	homestead footprint acres	sq ft		sqrt	
1	2971067.43		68.21	9.743760435	176612.51		4.05		6.14	6.1	1	0.31	30.72	30.72	1337973.54		1156.71
2	845516.94		19.41	2.772914008	183767.98		4.22		6.39	2.8	6	0.32	31.96	31.96	1392181.64		1179.91
3	1952587.98		44.83	6.403607426	117000.13		2.69		4.07	2.7	7	0.20	20.35	20.35	886364.62		941.47
4	979469.94		22.49	3.21221939	178934.71		4.11		6.22	3.2	5	0.31	0.00	31.12	1355565.98		1164.29
5	534836.81		12.28	1.754023396	179622.10		4.12		6.25	1.8	8	0.31	31.24	31.24	1360773.46		1166.52
6	1199094.65		27.53	3.932489334	1210519.13		27.79		42.11	3.9	3	2.11	210.53	210.53	9170599.48		3028.30
7	1910590.28		43.86	6.265873933	100891.55		2.32		3.51	3.5	4	0.18	17.55	17.55	764329.95		874.26
								sum 4,5		5.0	2						
										24.01							